A CROSS SECTIONAL STUDY ON PREVALENCE OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE AMONG ADULTS AGED 30 YRS AND ABOVE IN ELLAPURAM BLOCK OF THIRUVALLUR DISTRICT, TAMILNADU 2012.

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CERTIFICATE

This is to certify that the dissertation titled **'A CROSS SECTIONAL STUDY ON PREVALENCE OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE AMONG ADULTS AGED 30 YRS AND ABOVE IN ELLAPURAM BLOCK OF THIRUVALLUR DISTRICT, TAMILNADU 2012.'** is a bonafide work carried out by **Dr. S.PRIYA**, Post Graduate student in the Institute of Community Medicine, Madras Medical College, under my supervision and guidance towards partial fulfillment of the requirements for the degree of M.D. Branch XV Community Medicine and is being submitted to The Tamilnadu Dr.M.G.R.Medical University, Chennai.

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ABBREVIATIONS

ATS	-	American Thoracic Society
BMI	-	Body Mass Index
BOLD	-	Burden of Obstructive Lung Disease
COPD	-	Chronic Obstructive Pulmonary Disease.
CI	-	Confidence Interval
DALY	-	Disability Adjusted Life Years
df	-	Degree of Freedom
ERS	-	European Respiratory Society
GOLD	-	Global Initiative for Obstructive Lung Disease
IPAG	-	International Primary Airways Group
LPG	-	Liquid Petroleum Gas
NHANES	-	National Health And Nutrition Examination Survey
NS	-	Not Significant
OR	-	Odds Ratio
PEFR	-	Peak Expiratory Flow Rate
SD	-	Standard Deviation
SPSS	-	Statistical Package for Social Sciences
SS	-	Statistically Significant
WHO	-	World Health Organisation

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INTRODUCTION

1. INTRODUCTION

According to WHO, Chronic Obstructive Pulmonary Disease is one of the non communicable diseases included under the term "Chronic Respiratory Diseases". As per WHO, Non communicable diseases refer to "Diseases that are chronic, life style related and usually progressive when not intervened" .This holds true for COPD also as it is chronic, progressive and most of the risk factors are lifestyle related (smoking, biomass fuel exposure etc). In India, it is acknowledged as a predominant health problem & requires management at primary care setting itself. [1] It is predominantly a disease caused by smoking although other risk factors may be responsible.

A Working definition of COPD is given within the GOLD (Global initiative for Chronic Obstructive Pulmonary Disease) Global strategy 2011 as [(2)]

> "Chronic Obstructive Pulmonary Disease (COPD), a common preventable and treatable disease, is characterised by persistent airflow limitation that is usually progressive and associated with an enhanced chronic inflammatory response in the airways and the lung to noxious particles or gases".

Some patients develop significant airway limitation even without having symptoms like chronic cough and sputum production.[2] Hence, the abovesaid definition did not include the symptoms aspect.

BURDEN OF COPD

COPD is a leading cause of morbidity & mortality worldwide and also causes social and economic burden on the patient and health care infrastructure,[1]

which is increasing.[3,4] Burden of COPD is cumulative like any other chronic disease.

Mortality

According to the estimation of WHO, 64 million people had COPD and 3 million deaths occured in 2004 .According to Global burden of disease study, COPD is estimated as the 4th most common cause of death worldwide in 2008 and has projected to become 3rd leading cause of death worldwide by 2020 [3,4,5] and in middle income countries by 2030.This increase is attributed to unceasing exposure to risk factors and aging of the world's population.[4]

Morbidity

It is a well known fact that DALY (Disability Adjusted Life Years) is one of the ways for measuring morbidity. An estimation by Global burden of disease Study reveals that COPD leads to 1.68 Year Lost due to Death / 1000 population contributing for 1.8% of all Year Lost to Deaths (YLD).[5] Also, COPD is expected to become 5th leading cause of loss of DALY by 2020 worldwide, by 2030 in middle income countries as per global burden of disease study.[5] The morbidity data is limited and this data says that as age increases, morbidity caused by COPD also increases.[6,7,8] It also gets feigned by co-morbid diseases like diabetes, musculoskeletal disorder etc.[9]

Social burden

By means of airway obstruction, COPD causes breathlessness during exertion which slowly advances to severe disability and respiratory failure. Thus it limits the

day to day activities of an individual, making him confined to bed, ultimately leading loss of work.

Economic burden

COPD is associated with the significant economic burden. COPD exacerbations account for the greatest proportion of economic burden on health care system .In Europe, COPD accounts for 56% of total direct cost for respiratory disease which is 6% of total health care budget.[10] In united states, the estimated direct costs of COPD are 29.5 billion dollars and indirect costs are 20.4 billion dollars.[11] In India, according to NCMH background papers by murthy etal, the annual treatment costs for COPD has been estimated to be >Rs. 35000 crores in 2011 and projected to be >Rs. 48000 crores in 2016.[12]

Prevalence of COPD

There are significant variations in prevalence data because of different survey methods, diagnostic criteria and analytical methods.[13,14] Different survey methods are self report, physician diagnosed COPD, only questionnaire, spirometry etc.

Global prevalence

Earlier reports revealed higher prevalence rates for developed countries than Asian countries. But the recent reports by Tan WC etal reveals a prevalence of 6.3% combining 12-Asia Pacific countries which is almost two times higher than the overall projected value of 3.8 % made by WHO for Asian countries.[15] Recently,

Burden of Obstructive Lung Disease (BOLD) has carried out surveys in several parts of the world and estimated a prevalence of 3-11% among never smokers.[8]

Prevalence in India

As mentioned earlier, Indian studies on COPD too varied enormously in regards to methodology, diagnostic criteria and results thus causing variation in prevalence rates. SK Jindal et al from department of pulmonary medicine, Chandigarh had reviewed all Indian studies on COPD in 2001.[16] Out of 14 review studies, Only two studies were from south India.[17,18] Prevalence rates in most of these studies varied around 4-6% for males & 2-4% for females.

The Indian Council of Medical Research (ICMR) sponsored a study in India on Epidemiology of Asthma and Chronic bronchitis in 2006 including 4 centres namely Delhi, Chandigarh, Bangalore and Kanpur.[19] This study reported a prevalence rate of 5.0 % for males and 3.2 % for females > 35 years of age. This study was based on self reported questionnaire alone..

Risk Factors

COPD is a polygenic disease as it results from gene-environment interaction. Like all other chronic diseases, COPD has modifiable & non-modifiable risk factors that are preventable.[2]

Modifiable factors

Cigarette smoking is the commonest risk factor noticed globally. [20, 21] but various epidemiological studies has got enough evidence that non smokers may also

develop COPD.[22, 23] This indicates the presence of other factors like environmental tobacco smoke exposure, dust exposure at work place, outdoor air pollution & indoor air pollution.[24,25,26] Recent report says that exposure to biomass smoke produced during heating & cooking biomass in poorly ventilated houses has become an important risk factor among women especially in developing countries.[27] Low socioeconomic status was also found to be an another important risk factor in many epidemiological studies.[28]

Thus COPD is preventable to a large extent if the risk factors are controlled.

Non-modifiable Factors

These are age, heredity, gender etc

Symptoms of COPD

COPD is characterised by chronic cough or sputum production, dyspnoea that is persistent and progressive with history of exposure to risk factors.

Burden of disease estimation is important for decision making, planning, prioritising and allocating funds.[16] This is specifically important for diseases that are associated with preventable factors like tobacco smoking. But, after exhaustive review of literature, it was noted that there are not much data on prevalence of COPD in south India, especially in Tamilnadu .Hence the need of this study and it had been undertaken in order to estimate the prevalence of COPD in Ellapuram block of Thiruvallur District among adults aged 30 yrs and above and its relation to various risk factors.

OBJECTIVES

2. OBJECTIVES

1) To estimate the prevalence of Chronic Obstructive Pulmonary Disease among adults aged 30 years and above in Ellapuram Block of Thiruvallur district, TamilNadu, 2012.

2) To study the associated risk factors & its prevalence.

JUSTIFICATION

3. JUSTIFICATION

1) According to WHO, COPD is a major public health problem with increasing prevalence especially in developing countries.

2) COPD is the leading cause of chronic morbidity and mortality worldwide [3,4] and it has projected to become 3rd leading cause of death worldwide by 2020 [3,4,5]

3) Also, COPD is expected to rise to 5th leading cause of loss of DALY by 2020, as per global burden of disease study.[5]

4) It also causes huge social and economic burden on the patient and health care system .In India, the annual treatment costs for COPD has been estimated to be >Rs. 35000 crores in 2011 and projected to be >Rs. 48000 crores in 2016.[12]

5) A disease with Such a huge burden is a preventable and treatable one

6) The disease has a long asymptomatic phase and by the time the patient develops symptoms, 50% of their lung function capacity will be affected, and much of the lung damage is irreparable.[29]

7) By early diagnosis and prompt intervention it is possible to relive symptoms, prevent complications and reduce morbidity & mortality [30] thereby improving the quality of life.

8) Moreover, most of the risk factors are modifiable and stopping exposure to these factors, even in the presence of significant airflow limitation, slows or even halt the progression of disease. Some improvement in lung function may also occur [2]

9) Although several prevalence studies had been conducted in India, there are only few population based studies and most of these were conducted two decades back. After exhaustive review of literature, it has been found that the recent data on prevalence of COPD is less in south India, especially Tamil Nadu.

REVIEW OF LITERATURE

4. REVIEW OF LITERATURE

CHRONIC OBSTRUCTIVE PULMONARY DISEASE

4.1 HISTORY

Chronic obstructive pulmonary disease (COPD) is a lung disease characterized by airflow obstruction that interferes with normal breathing and worsens over time. COPD is preventable, and can be treated and managed effectively, when the disease is diagnosed early. Historically, the bronchitis component which we today label as Chronic bronchitis (chronic cough and mucus secretion) was first described by Badham in 1814.[31] In 1821, Laënnec also described the chronic bronchitis aspect, but in addition, he also portrayed the emphysema component of the disease. An association between chronic bronchitis and emphysema was discovered from post mortem studies into the morphology of the airways and lung parenchyma.[31]

4.1.1 COPD TERMINOLOGY

Diagnostic labels used for COPD, during the 1950´s and 1960´s were ‘chronic bronchitis’, ‘chronic obstructive lung disease’ (COLD), ‘Chronic obstructive respiratory disease’ (CORD) etc. In 1964, the term Chronic Obstructive Pulmonary Disease (COPD), was first mentioned by Mitchell in USA. It is the well established clinical term for obstructive lung function impairment most often due to chronic bronchitis and/or emphysema. Emphysema is defined anatomically by airspace enlargement due to disappearance of alveolar septae. Chronic bronchitis is

characterized by chronic cough and sputum production that is present for > 3 months in a year for the past 2 years. [2]

4.1.2 DEFINITION OF COPD ACCORDING TO GUIDELINES

The most well known guidelines were the American Thoracic society (ATS, 1995), the European Thoracic Society (ERS), and the British Thoracic Society (BTS, 1997). Some years later , the US National Heart, Lung and Blood Institute (NHBLI) together with World Health Organisation founded the Global Initiative for Chronic Obstructive Lung Disease (GOLD). This is an international guideline for COPD with the main aim to increase the awareness on COPD, and to decrease morbidity and mortality of the disease. The first GOLD workshop result was presented in 2001 and there have been subsequent regular updates since then, with the most recent one in December 2011.[2] Most guidelines have also been updated since their inception. The definition of COPD according to the latest GOLD guidelines [2] states that:

> Chronic obstructive pulmonary disease (COPD), a common preventable and treatable disease, is characterized by persistent airflow limitation that is usually progressive and associated with an enhanced chronic inflammatory response in the airways and the lungs to noxious particles or gases.

4.1.3 COPD- An Undiagnosed Disease

Though there are published guidelines and standards for diagnosing COPD including the recent GOLD guidelines, COPD remains an undiagnosed & untreated disease due to the usage of multiple terminologies in definition, diagnostic criteria etc. [32]

4.2 PREVALENCE OF COPD

4.2.1 Global

In 1990, World Health Organisation / World Bank reported COPD prevalence as 9.33 per thousand individuals for males and 7.33 per thousand individuals for females but the prevalence was found to be higher in developed countries.[19] Now, globally, the prevalence of COPD is approximately 10% in the general population. [7]

In a review article by Halbert et al. in 2006, [13] the pooled prevalence of COPD from 26 studies among adults aged ≥40 years was 9-10%. The most common spirometric definitions used in that review were in accordance with the GOLD.

A multicentric population based study on COPD done among rural women in china in 2006,[33] reported a prevalence of 5.4% **.**This study also found a significant association of COPD with various factors like elderly, family history, low educational level, smoking, exposure to occupational dusts etc.

A study done in rural south china by Shengming Liu,etal in 2007,[34] reported a overall prevalence of 9.4%. This study also highlighted a significant association of COPD with biomass fuel exposure.

In Japan, the prevalence of 9.3% was reported in a primary-care setting study conducted among 2250 patients aged more than 40 years.[6]

Prevalence of COPD was found to be 27% in a study done by Hanna Sandelowsky etal in Sweden in 2006 among those with respiratory tract infections[35]**.** They included patients of 40-75 yrs with respiratory tract infection and they found that respiratory infection was not statistically associated with COPD.

In a Denmark study, done in 2012 by Løkke A, Ulrik CS etal,[36] COPD prevalence was reported to be 21.7% among adults > 35 yrs . They also found that number needed to screen to diagnose a new patient was 4.6

The results of a study from the northern part of Sweden by Lindberg A etal in 2006 [37] reported the prevalence of COPD according to the GOLD criteria as 57% of mild, 37% moderate, 5% severe, and 1% very severe forms of the disease.

In the Spanish epidemiological study by Penna et al, [38] 38.1 had mild, 39.7 moderate and 22% had severe forms of COPD according to ERS criteria.

4.2.2 INDIA

There are several studies on COPD in India but published before 1990 and there are only few population based studies in the past 10-15 years**.**[18,39, 40, 41]. Some are hospital based studies, some done in special groups like workers [42,43] or patient attendants. Only few studies had used standardized questionnaire and operational definition of chronic bronchitis. These studies reported the prevalence ranging from 1.3-4.9 in females and 1.4-9.4 in males**.**

Jindal et al in 2001,[16] published a review article on burden of COPD from population based Indian studies in adults of ≥30 years of age .There were 14 studies, of which only 11 were conducted in general population .The reported

prevalence varied significantly in different population based studies .(Table 1)[17,18,44, 39, 45-51] North Indians had a higher prevalence rate of 2.12% to 9.4% for males compared to south Indians (1.4% to 4.08%). The prevalence rates for females also varied between 1.33% to 4.9% for North and 2.55% to 2.7% for South. For epidemiological purpose, the median prevalence rates were calculated as 5 % for males and 2.7 % for females aged >30 years of age. There are limitations in this estimation because of differences in methodology, diagnostic criteria, data analysis etc. For ex: Most of the studies were questionnaire based and few studies used Peak Expiratory Flow in addition.

The biggest multicentric field study on COPD till date, in India, by SK Jindal in 2006[19] (which was sponsored by the Indian Council of Medical Research (ICMR) provides analytic data on prevalence and risk factors for COPD. Both rural and urban areas were covered in the field survey using standardized questionnaire at four large centres *i.e.*, Bangalore, Chandigarh, Delhi. Approximately 35000 adults aged > 35 yr of age were surveyed and the estimated prevalence was 4.1% with 5.0 % for men and 3.2 % for women. Prevalence rates varied significantly and the factors responsible for this were tobacco smoking, exposures to biomass smoke and environmental tobacco smoke.

A study by Sundeep Salvi etal[52] reported a prevalence of 5.1%.This study was done in 26 rural villages of pune among 3600 study subjects of >25 yrs of age using BOLD questionnaire and spirometry.

4.2.3 Prevalence in Tamilnadu

Ray d et al [18] did a prospective epidemiological study of COPD from 1981-1986 among the 9946 inhabitants of four villages of KV Kuppam block of north Arcot district, Tamilnadu. They diagnosed COPD based on questionnaire followed by peak flow meter only for the diagnosed persons to quantify airflow limitation. They reported point prevalence of COPD as on 31st march 1986 as 12.5/1000.

A population based study among rural women of southern India--Tamilnadu by Priscilla Johnson etal[53] reported a prevalence of 2.44%. They included approx 900 women of more than 30 years age group and did spirometry**.**

Table 1 : Prevalence of COPD in various Indian studies (Taken from http://www.indiachest.org/copd_guidelines/table1.html)

Study	Population	Year of study	prevalence (%)	
			Male	female
Wig [46]	Delhi Rural	1964	3.36	2.54
Sikand [45]	Delhi	1966	7.0	4.3
Viswanathan [47]	Patna	1966	2.12	1.33
Bhattacharya [48]	U.P. Rural	1975	6.67	4.48
Radha [44]	New Delhi	1977	8.1	4.6
Thiruvengadam[17]	Madras	1977	1.9	1.2
Viswanathan[49]	Delhi Rural	1977	4.7	3.5
	Delhi Urban	1977	8.0	4.3
Charan [50]	Rural Punjab	1977	2.28	1.63
Malik [51]	North India Rural	1986	9.4	4.9
	Urban		3.7	1.6
Jindal [39]	North India Rural	1993	6.2	3.9
	Urban		4.2	1.6
Ray [18]	South India	1995	4.08	2.55

The prevalence of COPD tends to be greater in older people, males and people with high smoking habits [28,38,54]

An important factor influencing the available data regarding the prevalence of COPD is the actual definition of COPD.[55] The different definitions used in these studies have led to difficulty in estimating the true prevalence. There is heterogenecity of spirometric definitions, and the different spirometric criteria invariably alter the prevalence of COPD.[56,57,58] Fixed FEV_1/FVC (VC) ratio < 0.7 is generally accepted as the most important guide to identify airflow obstruction. Given that FEV_1/FVC ratios declines with age, a fixed ratio could result in an increase in false positive diagnosis of COPD, resulting in a greater prevalence associated with ageing. Moreover, to obtain data for the prevalence of COPD, researchers have relied on either readings based on spirometric criteria, self-reported respiratory symptoms via a questionnaire, or a combination of the two. Prevalence based on self-reported respiratory symptoms and physician diagnosis of COPD must be regarded as the most imprecise due to the lack of both sensitivity and specificity. For example, self-reported methods will include people with chronic bronchitis but without airway limitation. Furthermore, the disease will not be diagnosed until COPD patients have clinically obvious symptoms such as dyspnoea, but the fact is that mild to moderately advanced COPD patients may not have any symptoms at all. Hence, there exists the chance of missing them by self reported questionnaire.

4.3 ETIOLOGY OF COPD

There are three hypotheses about the etiology of COPD, the British hypothesis, the Dutch hypothesis, and the Fletcher hypothesis.

According to the *British hypothesis*, host and exogenous factors like repeated chest infections, air pollution and smoking influence the pathogenesis for chronic bronchitis. This in turn leads to hyper secretion of mucus which inhibits the host defence, causing repeated acute or chronic respiratory tract infections and eventually a decline in lung function.[31]

The *Dutch hypothesis* on the other hand, proposed that host genetic factors, and environmental factors predict the hosts response to the exogenous factors.[31] According to this theory, asthma, chronic bronchitis and emphysema are different expressions of a primary abnormality in the airways, and an interaction between genetic predispositions (atopy and bronchial hyper responsiveness) and exogenous factors (smoking) determines which manifestation a subject develops. The reason why subjects exposed to identical exogenous factors (tobacco smoke and environmental pollution), developed different symptoms and manifestations i.e. chronic bronchitis on its own, or in addition to airflow obstruction can be explained by this concept of genetically determined host factors. According to this hypothesis, asthma and COPD have a single genotype with two phenotypes.

Fletcher is probably the most well known researcher in this field from that time. In 1970's, he stated the *Fletcher hypothesis*, which resembles the Dutch hypothesis.[59-61] Fletcher revealed that in susceptible smokers (comparable with host factors), tobacco smoking is strongly related to chronic bronchitis and airflow obstruction, and that these were two different diseases. One of the two diseases was chronic bronchitis without airflow obstruction and the other was airflow obstruction which in some individuals could co-exist with chronic bronchitis. As part of normal ageing process, in a healthy non smoker, from the age of 30–35 years, the FEV1

declines by 25-30 ml /year approximately but in a smoker, the decline gets doubled to 50–60 ml per year as per Fletcher and Peto.[59]

Fletcher also showed that smoking cessation could halt this rapid decline. It was demonstrated that different populations of smokers, i.e. susceptible and non-susceptible smokers, showed different trends in their lung function decline.[59-61] He found male smokers to have a mean decline of about 50 ml/year and some with rapid decline of about 90 ml/year, while smoking cessation returned the decline to a non-smoking level.[59]

4.4 RISK FACTORS OF COPD

Risk factors for COPD can be divided into environmental and genetic host factors with the disease arising from an interaction between the two factors.

Table: 2 Preventable risk factors associated with the development of COPD[4]

a) Smoking	I. Tobacco smoking	Cigrattee Bidi
	II. Environmental Tobacco smoke	Maternal smoking Passive Smoking
b) Work exposure of Occupational dust		
c) Air Pollution	I. Indoor Pollution II. Outdoor Pollution	
d) Diet		
e) socio economic status		

4.4.1 SMOKING

4.4.1.1. Tobacco Smoking

The US Surgeon General reports states that cigarette smoking is the predominant cause of COPD for both males and females. [20]

Similarly in India, it has been found in a study by SK Jindal et al[16] that tobacco smoking was responsible for over 82% of COPD .Report on tobacco control in India in 2004 by Reddy KS[62] also mentioned the same findings.

'Pack years' is used to quantify the relationship between amount of cigarettes and the duration of smoking .The formula [29] used to calculate pack-years is

$$\frac{\text{Number of cigarettes smoked per day}}{20} \times \text{duration of smoking}$$

For example, if a patient smoked 10 cigarettes for 30 years, the formula is $\frac{10}{20} \times 30 = 15$ pack years

According to a book written by Margaret Barnett on "COPD in primary care" in 2006,[29] a smoking history of 20 pack years is a significant factor contributing to COPD.

Bidi is a famous smoking product of Indian cottage industry containing crude tobacco in dried leaf of tendu tree and smoked as a cigarette. Yet other famous method is to keep tobacco in a clay container and smoke either directly or indirectly

by using long tube passing through a water container (*i.e.*, 'hukkah') – This is common in older persons and in the Middle East.[63]

In an Indian study by Jindal SK et al in 2006 [19], COPD was encountered in smokers using these different tobacco products and the COPD prevalence among bidi smokers were 8.2% and cigarette smokers were 5.9 % .This difference of higher prevalence among bidi smokers than cigarette users was significant.

Almost half of study population-46.6% of smokers were found to have COPD in a study done in semi rural area of Belgium by Vandevoorde J, et al in 2007.[64]

In a study by Tinkelman DG et al [65] done in USA, COPD prevalence among smokers of > 40 years age was found to be 18.9%.

Bidi is more commonly used than cigarettes in India.[62,66] A study by Rahman M et al in 2000 on Bidi smoking and health reported that though the amount of tobacco used in bidi is ¼ th of cigarette, it is equivalent to cigarette smoking as higher puff frequency is essential to keep bidi alight that of cigarette. Hence it is more likely associated with functional impairment of lungs than cigarette smoking.

Chhabra SK et al [67] did a study on patterns of smoking in Delhi in 2001 and found that bidi smoking of > 2.5 pack years was associated with respiratory symptoms and airflow limitation than cigarette smoking.

Smoking cessation

Abstaining from smoking is the most effective strategy in halting the progression of COPD and Studies had revealed that this has a beneficial effect on cough, sputum and FEV1. This was also observed in a randomised study by Kanner RE etal[68] in which smoking cessation intervention group had significant improvement in symptoms.

As already mentioned, Fletcher and Peto[59] observed that decline in FEV1 decreased after quitting smoking. This finding was also supported by Lung Health Study[69] which revealed a slight improvement in FEV1 during the first 2 years after quitting smoking followed by a lesser decline in FEV1 thereafter. But continuous decline occurs in smokers who smoke continuously**.** The above findings mark the importance of smoking cessation .

4.4.1.2. Environmental tobacco smoke

According to Dayal HH etal,[70] Passive smoking to cigarette or bidi has also contributed to the development of COPD as they increase the lung burden of inhaled gases.

Passive smoking from male smokers inside the home is a predominant risk factor for COPD in non smoker females.[26]

Those Exposed to environmental tobacco smoke had an odds of 1.4 for developing COPD than others. This important observation was made in a multicentric study by Jindal et al in India. [19]

4.4.2 Outdoor air pollution

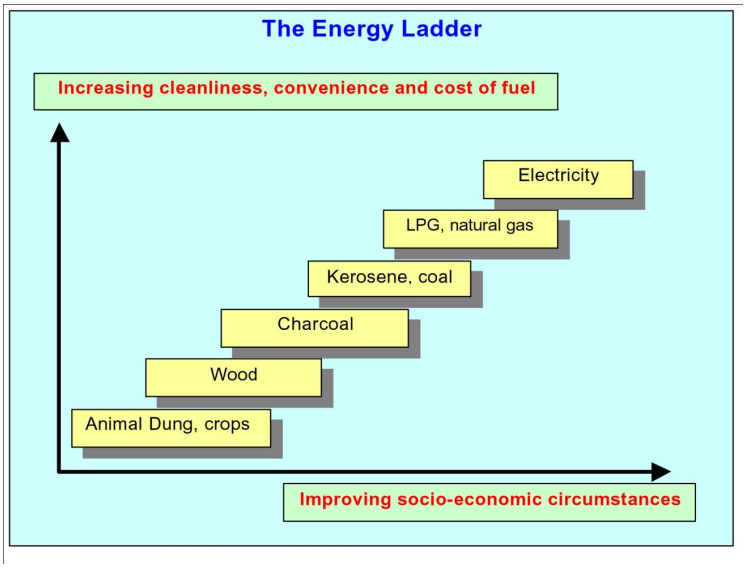
Studies from west by Sunyer J in 2001[71] had found significant association between COPD and air pollution.

Though there are evidences that air pollution aggravates COPD, its role is minimal when compared to cigarette smoking (Bourke, 2003). Outdoor air pollutants are heavy particulate matter, carbondioxide, sulphur dioxide and nitrogen dioxide (released by the burning of coal and petroleum fossil fuels) and ozone . Air pollution has worsened now-a days due to traffic congestion (vehicle exhaust), poor housing, sanitation, garbage accumulation etc.

4.4.3. Indoor air pollution

The highest concentration of indoor air pollutants are due to burning of biofuels or biomass fuels. They refer to any plant or animal based material burnt by humans such as wood, dung cake, agricultural crops etc.

Fig: 1 The Energy Ladder (smith et al 1994)



The above figure shows the step ladder pattern of the type of cooking fuel. As the ladder goes up, cleanliness and cost of fuel also increases.

Globally, approximately 3 billion people are using biomass as their fuel for cooking and heating[2] and these are also widely used by rural households in India. It has been estimated that 75% of rural India use this fuel for cooking.[72]

According to GOLD guidelines 2011, cooking wood, cowdung or coal in open air or using poorly functioning stoves has led to highest ever measured level of air pollution[2].

Exposure to this biomass smoke became a predominant risk factor especially for women in rural of developing countries who face more burden.[73]

Biomass combustion releases carbon monoxide, nitrogen dioxide, sulphur dioxide, formaldehyde, carcinogens such as benzene, benz(o)pyrene etc. which play a important role in etiopathogenesis of COPD according to a study by Balakrishnan K etal.[74]

In a study by Priscilla Johnson et al among Tamilnadu rural women,[53] prevalence was high among biomass fuel users than clean fuel users with an odds of 2.5 Vs 2.0 though statistical association was not obtained.

Depending on the social and economic background, type of fuel used in India varies. The other type of fuel used in India are LPG and Kerosene stove. Toxic respiratory irritants are produced by kerosene stoves. With regards to LPG, butane gas is free of any respiratory effect, methane added in LPG to detect leakage is also in smaller quantities only and CO that is released during burning of LPG is also

quickly converted to carbon di oxide.[75] On the whole, LPG pose a very little respiratory problem in a well ventilated house.

Other causes for indoor air pollution are passive smoking, smoke from near by houses, pollutants from furniture, building material, biological organisms etc.

4.4.3.1 Impact of improved cooking stoves on indoor air pollution

Fig :2 Improved cook stove (Sukhad stove)

It is a double hole stove with chimney. stronger heat is produced under both the holes thereby reducing the cooking time. A study by Chaya Chengappa etal [76] on the impact of improved cook stoves one year after installation in Bundelkhand region of central India has showed significant decline in indoor pollutants such as CO, SO2 etc.,

4.4.4. Occupational exposure

Occupational exposure to organic and inorganic dusts, chemicals, fumes are under appreciated risk factor for COPD as observed in studies by Trupin L et al in

2003[77] and Matheon MC et al in 2005.[78] But When the exposure is intense or prolonged, they can cause COPD independently apart from factors like cigarette smoking.[4]

Table: 3 Occupational risk factors for COPD

Agents with Good evidence are
Cadmium
Silica
Jobs with higher risk of COPD
Coal miners
Construction or Cement workers
Furnace / metal workers
Transport
Wood / Paper
Cotton
General Population
Exposure to Dust/ fumes

Source : G. Viegi Epidemilogy of COPD Respiration 2001, 68:4-19

4.4.5 GENETIC FACTORS

As already stated, COPD occurs as a result of genetic & environmental interaction. This has been proven by the fact that all smokers does not develop significant COPD.

A study by Lundback et al in 2003[54] found that 15-50% of smokers only developed COPD i.e. genetic susceptibility of the individual to the environmental exposures play an important role.

Moreover, familial risk of airway obstruction was seen in the siblings of severe COPD patients in a study by McCloskey et al in 2001.[79]

4.4.6 Other factors:

4.4.6.1 Diet

Surya Kant etal[80] in his study, found that increased intake of salt and decreased intake of fruits and vegetables have also contributed for COPD mortality and morbidity**.**

4.4.6.2 Socioeconomic status:

In an epidemiological study of COPD by Viegi G etal,[28] it is strongly evident that low socioeconomic status is a risk factor for COPD and it has been proved in few other studies also **.** This may be attributed to the presence of factors like overcrowding, use of biomass fuel, poor nutrition, infections etc.

4.4.6.3 Age & Gender:

Many studies from developed countries has shown that COPD is almost equal in both the sexes which may be due to prevalence of smoking among women now-a-days.[11]

Many population based studies, for example: study done by Nanshan Zhong et al in china-2007,[81] Danielsson P, et al in Sweden during 2011,[82] Jindal SK et al in India 2006 [19] has proven that COPD is significantly associated with advancing age.

4.4.6.4 Tuberculosis:

A cross sectional population based study done by Danielsson P, et al [82] in Sweden has found significant association between COPD and previous tuberculosis (p value of 0.08).

4.5 Pathology & Pathogenesis

COPD is characterised by inflammatory and structural changes in airways, lung parenchyma and pulmonary vasculature. Factors involved in pathogenesis include oxidative stress, Protease-Antiprotease imbalance, inflammatory mediators like cytotoxic T cells, neutophils & macrophages**.**

4.5.1 Pathophysiology

It includes mucus hypersecretion, obstruction of small airways due to inflammation, fibrosis & mucus hypersecretion leading to decrease in FEV1, PEFR, gas-exchange abnormalities, Pulmonary hypertension due to hypoxic vasoconstriction etc.[2]

4.6 Symptoms

Disease begins with an asymptomatic phase and the symptoms phase starts only after a decline in lung volume to 50% of the predicted values**.**[29]

COPD is characterised by chronic cough, chronic sputum production & progressive and persistent dyspnoea.

4.7 Diagnosis:

According to GOLD guidelines (December 2011 Update)[2] the presence of any of the following symptoms in an individual over 40 years of age should clinch a clinical diagnosis of COPD followed by spirometry for confirmation.

a) Dyspnoea that is persistent, progressively worsens over time and is characteristically worse after exercise;

b) Chronic cough

c) Chronic sputum production;

d) History of exposure to risk factors such as tobacco smoke, smoke from biomass fuel or occupational dusts and chemicals and/or

e) Family history of COPD

Usually COPD patients will have only small amount of sputum after coughing bouts. Large volume of sputum production suggests bronchiectasis and purulent sputum reflects bacterial exacerbation.[2]

4.7.1 PHYSICAL EXAMINATION

Physical signs of airway obstruction are rare to see till significant impairment in lung function has occurred. Physical findings of hyperinflated lungs such as low-lying diaphragms, decreased breath sounds, obliteration of cardiac dullness and hyperresonant chest percussion are highly specific for COPD, but usually found only in advanced disease.

Badgett RG etal,[83] in his study, revealed that it is a crude and insensitive means of detecting airway obstruction and is only rarely diagnostic in COPD.

4.7.2 Spirometry

As per GOLD guidelines updated 2011,[2] spirometry is the gold standard for confirming and staging COPD. It can be used not only for the diagnosis but also for classification of its severity, and progression of the disease.

4.7.3 RADIOLOGY

4.7.3.1 CHEST XRAY

Postero-anterior and lateral chest films may be entirely normal in mild disease. As COPD advances, abnormalities reflect emphysema, hyperinflation, and pulmonary hypertension..

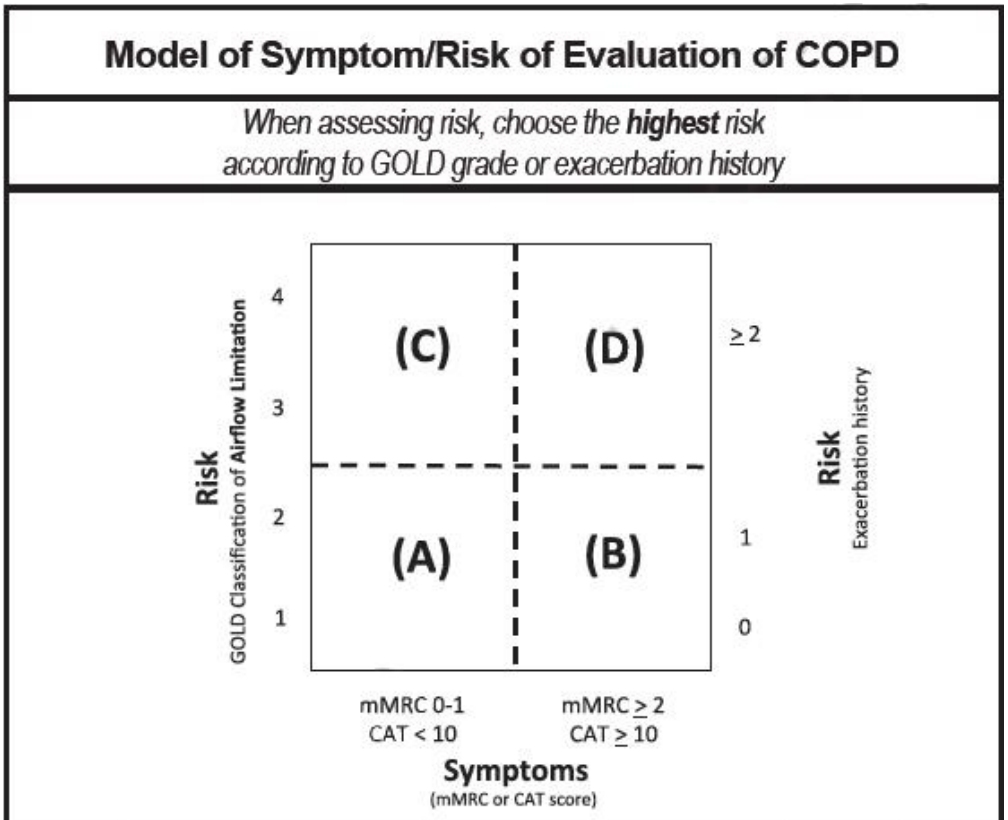
4.7.3.2 OTHER TESTS

CT scan, lung volume measurements by plethysmography, helium dilution, nitrogen washout, or single-breath methods typically show hyperinflation (elevated TLC) and air trapping (elevated residual volume [RV]), and thus are useful to exclude restrictive lung diseases. The carbon monoxide diffusing capacity (DLCO) is an indicator of emphysema and is roughly inversely correlated with the anatomic extent of emphysema in patients who have an FEV_1 greater than 1.0 L.

4.7.4 Risk assessment

According to GOLD guidelines 2011**,** before starting treatment, patient's risk should be assessed based on severity of symptoms measured by COPD Assessment Test(CAT), grading of disease severity by lung function test and risk of exacerbations **(**table:4)

Table : 4 Risk assessment



Patient Category	Characteristics	Spirometric Classification	Exacerbations per year	mMRC	CAT
A	Low Risk, Less Symptoms	GOLD 1-2	≤1	0-1	<10
B	Low Risk, More Symptoms	GOLD 1-2	≤1	≥ 2	≥10
C	High Risk, Less Symptoms	GOLD 3-4	≥ 2	0-1	<10
D	High Risk, More Symptoms	GOLD 3-4	≥ 2	≥ 2	≥10

Source: GOLD guidelines updated 2011,pg: 43

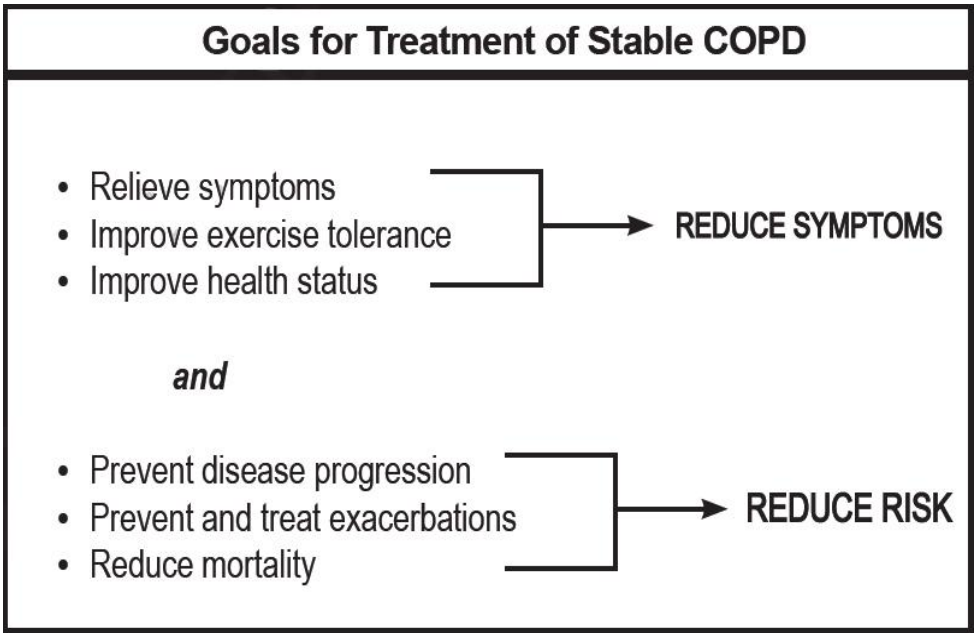
4.8 Complications of COPD

- Bronchiectasis
- Lung carcinoma
- Pneumothorax
- Pulmonary embolism
- Cor pulmonale

4.9 Treatment:

According to GOLD guidelines updated 2011, Once COPD is diagnosed, it should be managed effectively with individual assessment of the disease to reduce symptoms and future risks.

Table: 5 Treatment goals



Source: GOLD guidelines updated 2011,pg 42

According to Gold guidelines updated 2011[2], following are the key points in treating COPD patients

1. Smokers should be adviced smoking cessation as it is the most effective intervention to halt the progression of the disease.

2. Appropriate pharmacological therapy will relieve symptoms, reduce the frequency & severity of exacerbations thereby improving the exercise tolerance and quality of life.

3. Each pharmacological treatment should be patient specific & guided by severity of symptoms, grading, risk of exacerbations, etc.

4. Influenza & pneumococcal vaccine administration as it benefits especially elderly and severe patients.

5. All patients who are dyspnoeic while walking on level ground on own pace should be offered pulmonary rehabilitation**.**

4.9.1 Pharmacological treatment For COPD symptoms

There exists Evidence A for the use of bronchodilators either on regular basis or as-needed basis in reducing or preventing COPD symptoms.

Table 6 represents the doses of bronchodilators used in the treatment namely Beta 2 agonists, anticholinergics, combined therapy etc.

Table : 6 Doses of various bronchodilators

Drug	Inhaler (microgram)	Duration of action	Level of evidence in improving symptoms & lung volumes
Beta 2 agonists			
Short acting			Evidence B
Salbutamol	100, 200 (MDI & DPI)	4-6 hrs	
Terbutaline	400,500 (DPI)	4-6hrs	
Fenoterol	100,200 (MDI)	4-6hrs	
Long Acting			
Salmeterol	25-50 (MDI & DPI)	12hrs	Evidence A
Formoterol	4.5-12 (MDI & DPI)	12hrs	Evidence A
Indacaterol	75-300 (DPI)	24hrs	Evidence A
Anticholinergics			
Short acting			
Ipratropium bromide	20,40 (MDI)	6-8 hrs	
Oxitropium bromide	100 (MDI)	7-9 hrs	
Long Acting			
Tiotropium bromide	18 (DPI)	24 hrs	Evidence A
Combinationofbeta2agonis	**And anticholinergic**		
Salbutamol/Ipratropium	75/15 (MDI)	6-8hrs	
Corticosteroids			
Budesonide	100,200,400 (DPI)		
Beclomethasone	50-400 (MDI & DPI)		

Source: GOLD guidelines updated 2011

MDI-Metered Dose Inhaler DPI-Dried Powder Inhalers

4.9.1.1 Other drugs:

This includes 1. Methyl xanthenes—Theophyline (SR),100-600mg pill

2. Phosphodiesterase-4 inhibitor—Roflumilast, 500mcg pill once daily.

According to a randomized controlled trial by Calverley PM etal in 2009,[84] Roflumilast is more effective in improving lung function when combined with long acting bronchodilators. It acts by inhibiting the cyclic-AMP thereby reducing inflammation. It has no direct bronchodilator activity.

4.9.1.2 Combination bronchodilator therapy

The results of a study by Vogelmeier etal in 2008[85] says that Combination of bronchodilators with varied mode and duration of action increases the degree of bronchodilation with few side effects.

In a study by COMBIVENT inhalation solution study group [86], there exists evidence B for the finding that combining short acting beta2 agonists and anticholinergic is more effective in improving symptoms and lung volumes than either drug alone.

Table 7 represents the pharmacological treatment according to patient's group. Patients are classified into four groups A,B,C&D based on their risk assessment explained earlier in table 4.

Table: 7 Initial pharmacological treatment according to patient's group

Patient group	1st choice	2nd choice	Alternative choice
A	Short acting Anticholinergic / beta 2 agonist	Long acting Anticholinergic / beta 2 agonist	Theophyline
B	Long acting Anticholinergic / beta 2 agonist	Long acting Anticholinergic and beta 2 agonist	Short acting beta 2 agonist / anticholinergic or theophyline
C	Inhaled corticosteroid plus long acting beta 2 agonist or anticholinergic	Long acting Anticholinergic and beta 2 agonist.	Short acting beta 2 agonist and/or short lived anticholinergic or theophyline
D	Inhaled corticosteroid plus long acting beta 2 agonist or anticholinergic	Various combinations with inhaled steroids	Short acting beta 2 agonist and/or short acting anticholinergic or theophyline

Source: GOLD guidelines updated 2011, pg 46

4.9.2 Pharmacological treatment for smoking cessation

According to a randomized controlled trial by TakshinDP etal, Varenicline[87] and bupropion[88] have been found to have long term quit rates.

4.9.3 Non pharmacological treatment: It includes

4.9.3.1 Nicotine replacement therapy for smoking cessation

This includes nicotine gum, inhaler, nasal spray, patch etc.

4.9.3.2 Five step smoking intervention program

According to guidelines by American Medical Association [89] and cancer institute manual for physicians by Glynn TJ etal,[90] there are five step for smoking intervention.

Table: 8 Smoking intervention

1. ASK	Ensure that, for every patient at every clinic visit, tobacco-use status is questioned and documented.
2. ADVICE	Motivate all tobacco users to stop smoking in a clear, strong manner.
3. ASSESS	Ask every tobacco user whether they are willing to make a quit attempt at this time (e.g., within the next 30 days)
4. ASSIST	Help them in smoking cessation, provide counseling; intra-treatment social support etc., Recommend the usage of approved pharmacotherapy except in special situations.
5. ARRANGE	Schedule follow-up contact, either in person / telephone.

4.9.3.3 Vaccines

According to the recommendations of advisory committee on immunization practices by Centre for Disease Control (CDC) in 2009, influenza vaccine reduces severity and death.[91].Vaccine must be given one time a year.

Pneumococcal vaccine is advised for patients older than 65 yrs or younger patients with co-morbid conditions as per the report by Centre for Disease Control

titled “recommended adult immunization schedule”, 2010 [92] and a study by Jackson LA etal.[93]

4. Oxygen therapy & ventilator support for those with chronic respiratory failure.

5. Pulmonary rehabilitation

The components of pulmonary rehabilitation includes smoking cessation, exercise training, nutrition counselling and education. The aim is to decrease symptoms & improve quality of life. The minimum duration should be 6 weeks.[2]

Table :9 Advantages of Pulmonary Rehabilitation in COPD

1.	Increases exercise capacity .
2.	Decreases the perceived intensity of dyspnoea.
3.	Improves quality of life.
4.	Decreases the number of hospital admissions and days in the hospital .
5.	Decreases anxiety as well as depression associated with COPD .
6.	Improves survival .
7.	Improves recovery after hospitalization for an exacerbation .
8.	Increases the effect of long-acting bronchodilators .

Source : GOLD guidelines updated2011,pg 36

Table 10 below explains the overall non pharmacological treatment according to patient’s group.

Table : 10 Non-Pharmacological treatment of COPD

Patient group	Essential	Recommended	Depends on local guideline
A	Smoking cessation	Physical activity	Flu &pnumococcal vaccine
B-D	Smoking cessation Pulmonary rehabilitation	Physical activity	Flu &pnumococcal vaccine

Source: GOLD guidelines updated 2011, pg 44

4.9.4. Surgical treatment [2]

1. Lung volume reduction surgery for reducing hyperinflation
2. Bullectomy for emphysematous bullae
3. Lung transplantation

4.9.5 Monitoring & Follow up

According to GOLD guidelines updated 2011, monitoring and follow up of COPD patients for symptoms, smoking status, lung function, exacerbations, co-morbidities etc is very essential .

MATERIALS AND METHODS

5. MATERIALS AND METHODS

5.1 Study Design:

Community based cross sectional study

5.2 Study Area :

In Ellapuram block of Thiruvallur district, TamilNadu.

5.3 Study period:

August to October 2012.

5.4 Study Duration:

December 2011 to December 2012

5.5 Study population:

5.5.1 Inclusion criteria:

Both males & females aged 30 yrs and above

5.5.2 Exclusion criteria:

- Those not willing to participate
- Pregnant women
- Those with sputum positive pulmonary tuberculosis
- Those who are unable to understand and perform lung function test

- Persons with heart disease as assessed by history/records
- Those having any acute illness.

5.6 SAMPLE SIZE

Calculated Sample size : 470

Sample size covered : 480

5.6.1 SAMPLE SIZE CALCULATION:

Formula for cluster sampling method:

$\frac{z_{\alpha}^2 pq}{L^2}$ **x design effect**

Where,

Z alpha=1.96 at 95% confidence interval

P=Prevalence

Q=1-P

L=Allowable error

5.6.1.1 Calculation of design effect

Design effect=1+{ cluster size-1} x Rate of homogenecity

Cluster size of 20 was taken for this study as it is possible to see atleast 10 study subjects per day thus making 2 days visit for each cluster.

Rate of homogenicity = 0.02 {proportion of disease in general}

Therefore, design effect = 1+{20-1] x 0.02

=1+0.38

=1.38

Prevalence {P}= 22% based on pilot study. Though there are studies on COPD in India using peak flow meter,[17,18,39,44] all were done in the past and there are no recent studies. Hence pilot study was done and its prevalence was taken for sample size calculation of this study. Study population of the pilot study were excluded from the main study.

Q =1-22=78

L {allowable error of 20% of prevalence was taken for this study i.e. 20% of 22 = 4.4}.

Substituting all the above values in the formula,

$$= \frac{z^2_{\alpha} pq}{L^2} \text{ x design effect}$$

$$= \frac{1.96*1.96*22*78}{4.4*4.4} \text{ x 1.38}$$

$$= \frac{6592.19}{19.36} \text{ x 1.38}$$

= 469.89

= 470

Calculated Sample size = 470

5.7 Sampling method:

Cluster sampling method.

5.7.1 Method of choosing clusters

1) With the cluster size of 20, number of clusters needed = sample size / cluster size = 470/20 = 23.5= 24 clusters. Therefore, with equal cluster size of 20, sample size to be covered for 24 clusters was calculated as 24x20 = 480

2) Ellapuram block has 53 panchayat villages. The population of 53 panchayat villages varies from a minimum of 775 to a maximum of 7120 (Annexure VI)

3) Cumulative population of the villages were calculated.

4) Cluster interval = cumulative population / total number of required clusters

= 1,14,689 / 24

= 4778.7

= 4779

5) The cumulative population of a village, where the cluster interval (4779) fell was taken as the1st cluster and subsequent clusters were selected by adding cluster interval to the previous number and so on till the required number of clusters were obtained.

5.8 Measuring Tools:

1) Semi structured Questionnaire

2) Peak expiratory flow meter to measure airflow obstruction

1) Questionnaire for the present study was developed based on BOLD(Burden of Obstructive Lung Disease) questionnaire, GOLD guidelines updated 2011[2] and International primary Airways Group(IPAG-2005)-A guide for primary care physicians.[94] IPAG questionnaire which was used in this study for COPD scoring has identified questions in peer-reviewed literature as having more diagnostic value and has a sensitivity of 91% and specificity of 49% in diagnosing COPD according to a study by Sichletidis et al.[95] IPAG questionnaire has considered a score of ≥17 as a favourable score. Questionnaire was modified according to the local culture and validated with the help of expert & pilot study (Annexure III). It was translated into Tamil and back translated to English.

Questionnaire of the present study was divided into 6 parts namely

a) Socio demographic details

b) History regarding exposure to potential risk factors

c) History regarding respiratory symptoms

d) History to rule out Asthma

e) COPD scoring for smokers using IPAG questionnaire

f) measurement findings

2) Peak expiratory flow meter :

a) It is used to measure Peak Expiratory Flow Rate (PEFR) which is defined as the highest flow achieved from a maximum expiration (obtained from hard & fast blow) after maximum inspiration.[96]

b) In this study, Peak Expiratory Flow (PEF) was measured using pocket Peak-- mechanical peak flow meter which is ATS/EU complaint. (ATS-American Thoracic Society & EU-European)(Fig shown in annexure IX)

c) Validity of this instrument is +/- 10% satisfying the ATS/ERS Task force recommendations.[96]

d) Reliability of the instrument was tested daily against another peak flow meter and the same instrument was used throughout the study.

5.9 Data collection method

a) Data collection was done in the study area after obtaining permission from The Director of Institute of Community Medicine, Madras Medical College, The Dean of Madras Medical College and the Institute Ethics Committee (Annexure X).

b) Data was collected by house to house visit in the study area. In each selected village, a starting point was selected randomly and using right hand rule, adjacent houses were recruited continuously till 20 households were reached as the cluster size was 20. Where the house was locked, the next house was taken for the study. In each household, only one eligible person was selected for the study by simple random technique (lottery method).

c) After a brief introduction and obtaining their informed consent, relevant information was obtained from the respondent using the semi structured questionnaire in the local language.

d) Questionnaire was read out to the study subjects in the same order as listed in the questionnaire .

e) If the study subject did not understand the question, it was repeated in the same manner without probing for the answer.

f) Each study subject was then subjected to pulmonary function test (PEFR – Peak Expiratory Flow Rate) after measuring their height and weight.

5.9.1 Measurement of PEFR (Peak Expiratory Flow Rate)

PEFR measurement was done after undergoing basic hands on training in pulmonary function test at National Institute for Research in Tuberculosis, chetpet, Chennai. PEFR was measured following ATS/ERS Task force guidelines.[96] in litres/minute.

a) After giving prior instructions, technique was demonstrated separately to each individual.

b) Following demonstration, subjects were asked to make trial attempts to detect faults.

c) Once the study subject had gained confidence, the test was performed in the sitting position & he/she was asked to inspire maximally and blow out without any hesitation as fast and as hard as possible into the meter.

d) It was taken care that mouth was sealed tightly around the mouth piece of the peak flow meter during the procedure.

e) The test was repeated for 3 times for every individual & best of three attempts was taken for data analysis.

f) Disposable mouth piece was used for each individual.

Both within manoeuvre and between manoeuvre evaluation of the PEFR performance of each individual was done as per ATS/ERS guidelines.

Within Manoeuvre evaluation

For this evaluation, it was ensured that while blowing, there was good seal at the mouth and no hesitation in the start.

Between Manoeuvre evaluation:

For this evaluation, the 3 PEFR measurements of each individual was compared at the end and if the largest two out of three acceptable blows are not reproducible within 40 litres/minute, two additional blows were performed. This is done to detect manoeuvre induced bronchospasm.

5.10 Interpretation of PEFR

a) Since PEFR is influenced mainly by sex, age & height of the individual,[97] for interpretation, each observed value requires comparison with the reference values (also known as predicted values) for that particular age, height and sex. Predicted values can be estimated from the normal subjects of same anthropometric measurements[97]

b) Predicted values for this study was obtained from a study by Rajendra prasad et al[98] titled "Prediction model for PEFR for Indian population". This prediction model is based on age, sex & height of the individual. Formula for predicted values are as follows,

For males: -2.294 x age + 3.38 x Height in cms

For females: -2.8 x age + 3.05 x Height in cms

c) Then, observed value (best of three measurements) of each person was compared with the corresponding predictive value of that person for interpretation.

d) COPD was diagnosed as per the diagnostic criteria discussed later.

Although spirometry is the gold standard test for diagnosing COPD,[2] it was not used in this study because of the following practical issues in its usage in primary care setting [2,99,100]

a) It is costly and also not widely available

b) Involves complex procedure and consumes more time.

c) Calibration on a regular basis is needed for spirometry.

d) Investigator needs training in performing spirometry effectively.

e) Maximal patient effort is needed in performing the test .

f) Many studies have questioned its benefits in primary care setting

Hence, peak expiratory flow meter was used in this study which is

a) inexpensive

b) easily available

c) simple procedure that may be carried out in the field

d) requires only short expiration time in contrast to spirometry

e) easy to interpret .

Moreover , GOLD guidelines updated 2011[2] and many other studies support the use of PEFR in primary care setting where spirometry is not feasible.[101,102,103]

For example, a study by Jackson H et al in 2003,[101] made an important note that PEF ,when used as a screening method for COPD in primary care, will save money for interventions like smoking cessation rather than spending resources on spirometric tests. According to the same authors, [101] the peak expiratory flow rate (PEFR) cut-off value of < 80% of the predicted, has the sensitivity of 91% and specificity of 82% in diagnosing COPD and hence may prove to be a valuable tool in diagnosing COPD. Llewellin et al,[103] in his study, states that a normal peak expiratory flow may rule out clinically significant COPD in adults".

5.11 Other measurements used in this study

Each study subject's height & weight was measured for calculation of reference values for PEFR and Body Mass Index.

5.11.1 Height

It was measured using portable plastic staturemeter (Bioplus TM) which is a wall mountable type of stadiometer & has measurements upto 200cm and the same instrument was used throughout the study. During field survey, double sided glue tape (removable) was pasted on the back of the meter to fix it on the wall at a distance of 2meter from the floor. The study subject was then asked to stand against the wall without footwear, with feet together, standing as tall as possible with the eyes level and looking straight ahead Then end of the instrument was lowered to the level of head to measure height.

5.11.2 Weight

It was measured using a portable weighing machine (Bellita R). The scale was zeroed before weighing each person. Then the study subject was asked to stand on it without any footwear and looking forward. The same machine was used throughout the study & calibrated before each visit using standard known weights.

5.12 Services rendered:

Those who were diagnosed to have COPD were referred to the pulmonologist in near by Government hospital. Bronchodilators like deriphyline and salbutamol were prescribed for the persons having dyspnoea and they were also motivated to utilise the yoga services already available in nearby Government health facility. Health education regarding cessation/reduction of risk factors were given to the study population. For ex: smokers were given health education regarding adverse effects of smoking using posters and motivated to quit smoking. Those who were

using biomass fuel for cooking were adviced to change to cleaner fuels like LPG if affordable. Non affordable persons were adviced to improve the combustion efficiency by drying wood before using, using lid for cooking vessel while cooking etc. so that cooking period and exposure time will be reduced. Overall, all of them were adviced to improve ventilation in the kitchen wherever possible and to use chimneys. Apart from this, list of smokers in the study population were given to the corresponding local health worker for the purpose of reinforcing cessation of smoking.

5.13 Operational definitions

5.13.1 Operational definition of COPD

A study subject was diagnosed to have COPD when the observed peak expiratory flow rate is < 80% of the corresponding predicted value. This cut-off point is having a sensitivity of 91% & specificity of 82% [101] in diagnosing COPD i.e. it will detect more than 90% of persons with COPD in the community including all moderate and severe diseases.

5.13.2 Body Mass Index:

It was calculated as $\frac{\text{weight in kg}}{\text{height in m}^2}$

5.13.3 Smoker

A smoker was defined by the history of regular smoking of either cigarette, bidi or hookah, for 1 year or more.

5.13.4 Current smoker

A smoker who continued to smoke till one month prior to the date of survey.

5.13.5 Ex-Smoker

A smoker who stopped smoking for more than a month and continued cessation till the date of survey.

5.13.6 Non-Smoker:

Who has never smoked or smoked less than a year.

5.13.7 Passive smoking

A study subject was considered as passive smoker when one or more family member used to smoke in his /her presence.

5.13.8 Exposure to cooking fuel combustion

It was established by the history of regular cooking at home by the study subject.

5.13.9 Adequate ventilation

It is defined as the presence of cross ventilation or chimney or both

5.13.10 Chronic cough

It is defined as the presence of "cough on most of the days for atleast 3 months in a year for two consecutive years" [2]

5.13.11 Chronic sputum

It is defined as the presence of "sputum on most of the days for atleast 3 months in a year for two consecutive years" [2]

5.13.12 Dyspnoea Scale

Scale of British Medical Research Council was used to determine the degree of dyspnoea.

5.14 Data Entry

Data Entry was done in an Excel Sheet.

5.15 Data Analysis

It was carried out using SPSS Software version 16.0

The significance value established in all the analysis was P-Value < 0.05.

Chi square test was performed to determine the association between qualitative variables.

RESULTS

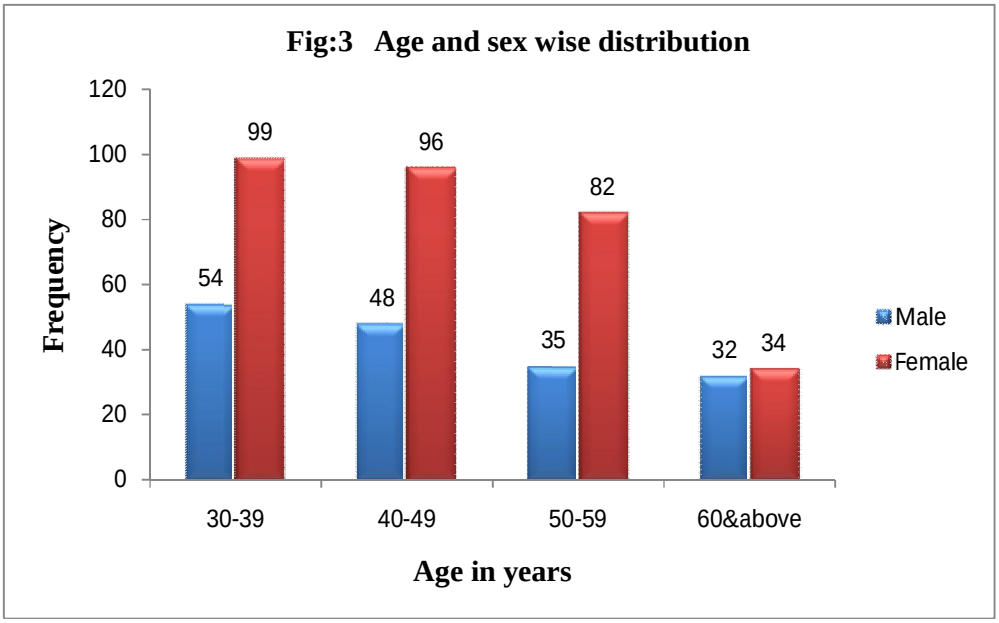
6. RESULTS

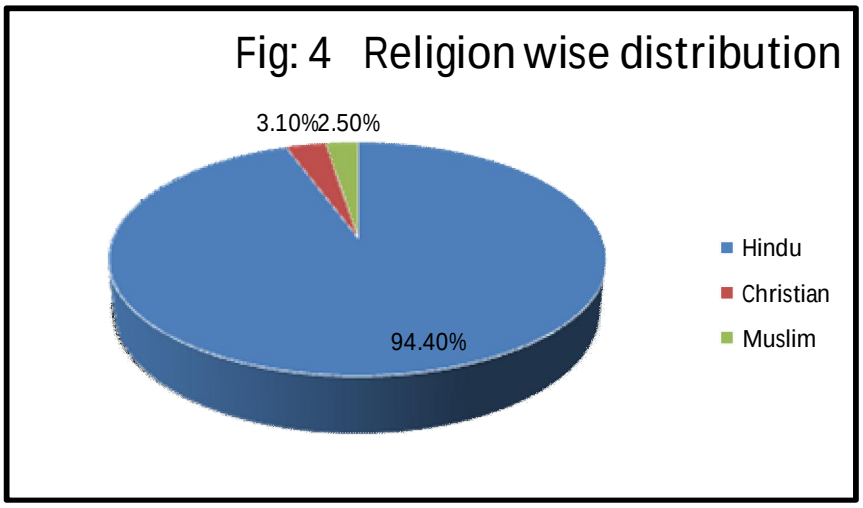
This cross sectional study included 480 participants from 23 Panchayat villages in Ellapuram block of Thiruvallur district, Tamilnadu. The study estimated the prevalence of Chronic obstructive pulmonary disease among the participants and also the risk factors for the disease.

6.1 Socio demographic details of the study population

Among the 480 adults who took part in this study, majority of them belonged to the age group of 30-39 yrs (31.9%) followed by 30% in 40-49 years age, 24.3% in 50-59 years and 13.8% above 60 years (Fig:3) Females were predominant in the study with 64.8% compared to males(35.2%)(Fig:1).It was also seen that among the study participants, 94.4% were Hindus, 3.1% Christians and 2.5% Muslims (Fig: 4)

Fig:3 Age and sex wise distribution





6.1.1 Education

Table: 11 shows that majority of the study participants were illiterates (36.9%) .Among the literates, those who completed 6th-12th std were the highest with 31.2% followed by primary education (27.1%) and degree/others (4.8%).

Table: 11 Education wise distribution of the study population

Education	No.	Percentage
Illiterate	177	36.9
1-5th	130	27.1
6-12th	150	31.2
Degree/ others	23	4.8
Total	**480**	**100**

6.1.2 Socio economic Status

The percapita income was calculated from the total family income mentioned by the participants and socioeconomic classification was done based on Modified BG Prasad scale (Annexure IV). From table:12, it has been observed that 6.7% belonged to class I, 10.8% in class II, 33.3% in class III, 35.4% in class IV and 13.8% in class V .

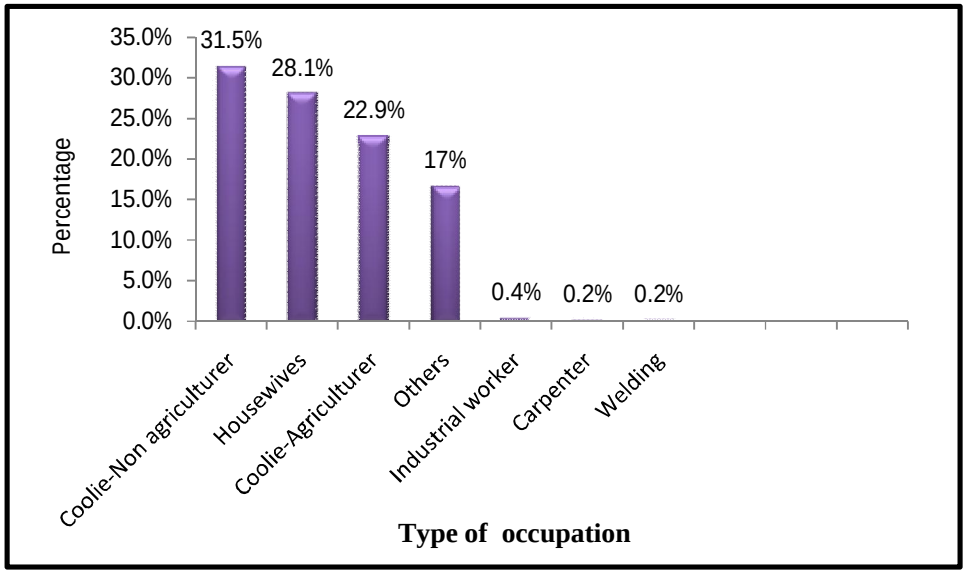
Table: 12 Socio economic Distribution of study population

Percapita income	SES	No.	Percentage
≥ 3259	Class I	32	6.7%
1630 -3258	Class II	52	10.8%
978 – 1629	Class III	160	33.3%
489 – 977	Class IV	170	35.4%
<489	Class V	66	13.8%
	Total	**480**	**100%**

6.1.3 Occupation

Fig:5 shows that majority of the study population were coolies (54.4%).Among these, agricultural coolies constitute 22.9%. Remaining were housewives (28.1%), carpenter (0.2%), welding (0.2%), industrial workers and others

Fig:5 Occupation wise distribution of the study population



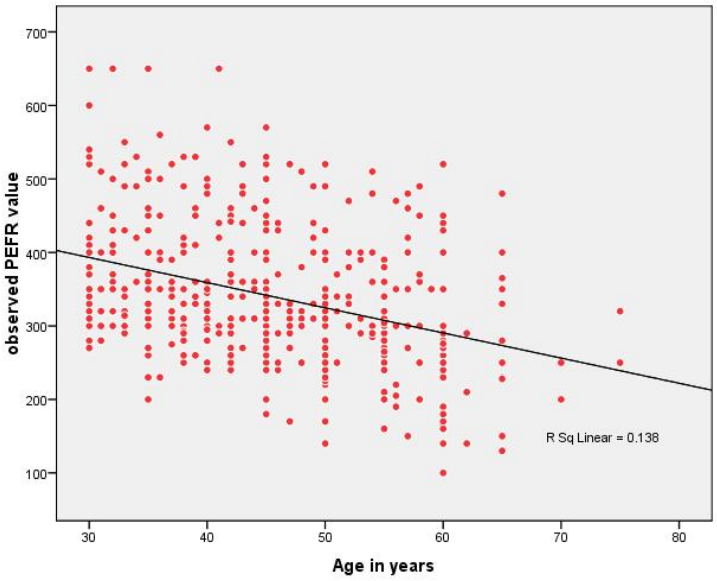
6.2 Distribution of mean Peak Expiratory Flow Rate (PEFR) in the study population

From table 13, it could be noted that mean Peak Expiratory Flow Rate (PEFR) among males (401.13) was significantly higher than the mean PEFR of females (306.37).

Table:13 Age and sex wise Distribution of Mean Peak Expiratory Flow Rate(PEFR)

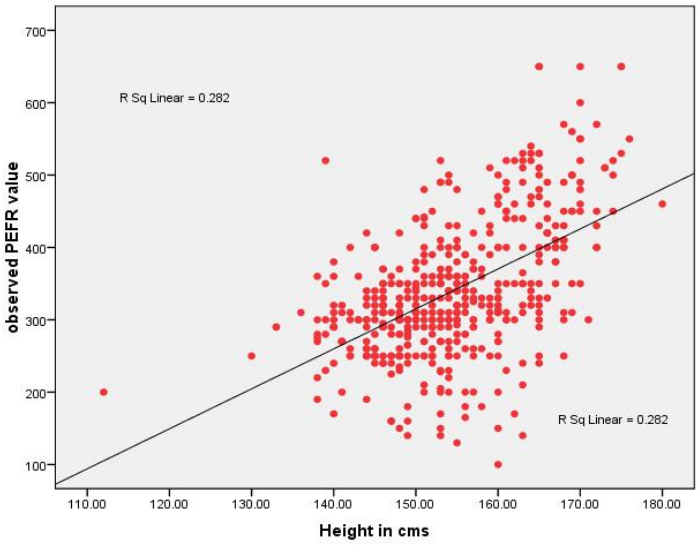
Age Group	sex	N	Mean	S.D	t-Value	P-Value
30 to 39 yrs	M	51	459.74	78.017	11.038	<0.001
	F	102	330.07	43.772		
40 to 49 yrs	M	50	433.87	81.331	10.321	<0.001
	F	96	304.89	47.080		
50 to 59 yrs	M	35	378.42	96.339	4.819	<0.001
	F	80	294.12	57.080		
60 yrs and above	M	30	263.07	97.548	0.355	0.724
	F	36	270.63	62.726		
Total	**M**	**165**	**401.13**	**110.16**	**10.367**	**<0.001**
	F	**315**	**306.37**	**54.08**		

Fig: 6 Age vs Observed PEFR value in the study population(Scatter Plot)



Scatter plot above shows a negative correlation between age and PEFR ($r^2 = 0.138$) i.e. As age increases, PEFR decreases.

Fig : 7 Height vs Observed PEFR Value (Scatter plot)



Scatter plot above shows a positive correlation between height and PEFR value **($r^2 = 0.282$)** i.e. As height increases, PEFR value also increases.

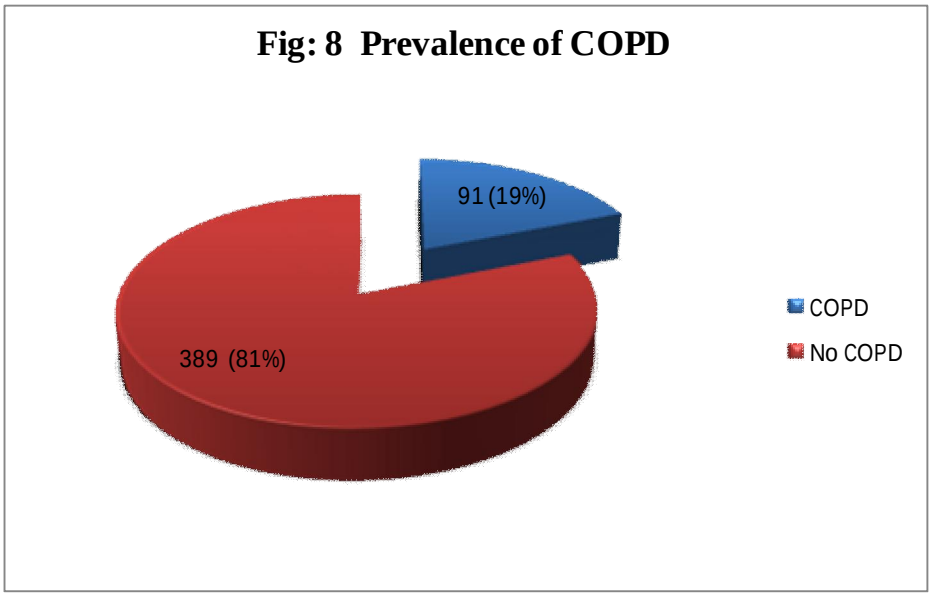
6.3 Prevalence of COPD in the study population

Those having PEFR value less than 80% of the predicted value were diagnosed to have COPD**.** Predicted values for this study was obtained from a study by Rajendra Prasad et al[98]. This prediction model is for Indians and based on age, sex & height of the individual. Formula for predicted values are as follows,

For males: -2.294 x age + 3.38 x Height in cms

For females: -2.8 x age + 3.05 x Height in cms

Fig:8 --Pie chart shows that 91(19%) of the study population were having COPD



6.3.1 Age wise distribution of COPD

Table: 14 represents the age wise distribution of COPD. Out of 480 study participants, 91(19%) were found to have COPD with 95% confidence interval of 14.1% to 23.2%.Apart from this, it is also seen that as age increases, COPD prevalence also increases gradually i.e. from 6.5% among 30-39years to 43.9% among more than 60 years age group.

Table : 14 Age wise distribution of COPD

Age group	Total No.	COPD No.(%)	95% CI
30-39 yrs	153	10 (6.5%)	3.4% - 12%
40-49 yrs	144	24 (16.7%)	10.9% - 25.3%
50-59 yrs	117	28 (23.9%)	13.9% - 37.5%
60 yrs & above	66	29 (43.9%)	29.1% - 49.6%
Total	**480**	**91 (19%)**	**14.1% - 23.2%**

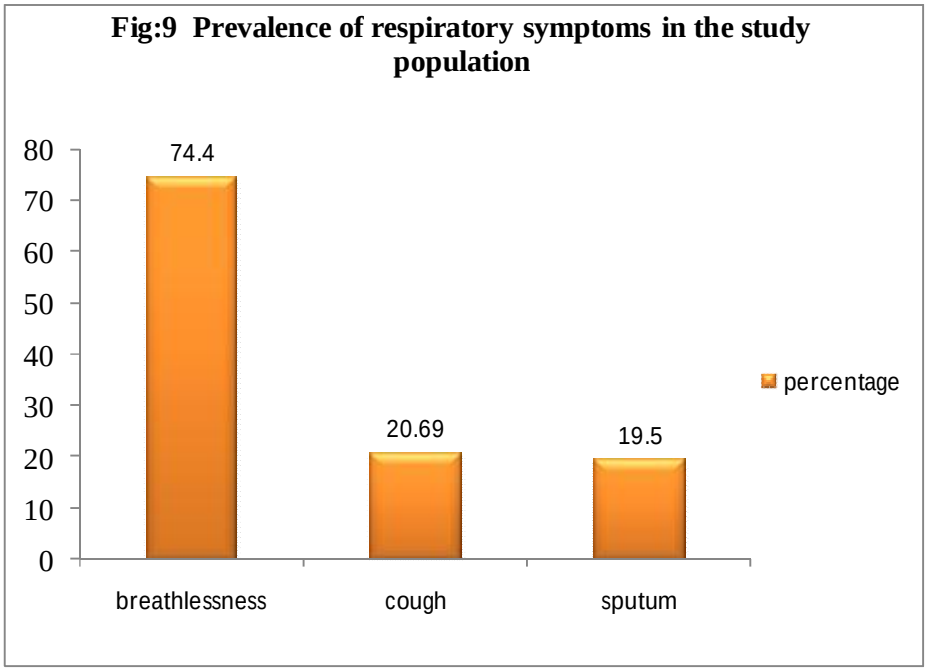
6.3.2 Sex wise distribution of COPD

Table : 15 Sex wise distribution of COPD

Sex	Total No.	COPD No.(%)	95% CI
Males	169	62 (36.7%)	26.2% - 48.7%
Females	311	29 (9.3%)	5.5% - 12.7%
Total	**480**	**91 (19%)**	**14.1% - 23.2%**

Table: 15 Shows that among the study participants, males had higher prevalence of COPD (36.7%) than females (9.3%).

Fig:9 Prevalence of respiratory symptoms in the study population



In the study population, 289(60.2%) were asymptomatics (i.e. not having any symptoms of chronic cough, chronic sputum production or dyspnoea). Among the symptomatics (191), breathlessness was the major symptom (74.4%) followed by cough and sputum production.(shown in fig:9)

6.4 Distribution of risk factors in the study population

Table: 16 Distribution of risk factors in the study population (N=480)

Risk factors	Frequency	percentage
Smoking status		
Current smoker	55	11.5%
Ex-smoker	43	9.0%
Passive smoker	136	28.3%
Indoor air pollution from cooking fuels		
Cowdung/coal/wood (biomass)	195	40.6%
Kerosene	20	4.2%
Both LPG & biomass	56	11.7%
Inadequately ventilated houses	365	76.0%
Past H/o pulmonary TB	11	2.3%
Occupation		
Welding	1	0.2%
Industrial worker	2	0.4%
Carpenter	1	0.2%
Low Body Mass Index (BMI<18.5)	47	9.8%

Table: 16 shows the distribution of various risk factors among the study population

6.4.1 Smoking status

In the study population it was observed that out of 480, 55(11.5%) were current smokers and 43(9.0%) were ex-smokers. 28.3% were passive smokers.

6.4.2 Indoor air pollution from cooking fuels

Majority of the study population i.e. 195 (40.6%) were using only biomass fuels (either cowdung, coal or wood) for cooking. 56(11.7%) were using both biomass fuel and LPG. Only 20 (4.2%) were using kerosene as cooking fuel.

6.4.3 Ventilation in the house

Almost three fourth (76.0%) were residing in inadequately ventilated houses.

6.4.4 Past history of pulmonary tuberculosis

In the study population, 11(2.3%) had past history of pulmonary TB which is also a risk factor proved in various studies.

6.4.5 Occupation

Various occupation identified as risk factors for COPD has been shown in Table:3. Majority of the study population were coolies and only few were involved in risky occupations like welding (0.2%), carpenting (0.2%) and working in industry(0.4%).

6.4.6 Body Mass Index (BMI)

Low BMI was also recognised as a risk factor for COPD in other studies. In this study population, 47(9.8%) had low BMI of $<18.5 kg/m^2$

6.4.7 Sex wise distribution of smoking status

Table: 18 shows the sex wise distribution of smoking status among the study population. 382 (79.6%) of the study population were non smokers and only 20.4% were smokers. It is also noted that there were no female smokers. Out of 169 males, 55 (32.5%) and 43 (25.4%) were current and ex-smokers respectively**.**

Table: 17 Sex wise distribution of smoking status

Gender	Current smokers	Ex-smokers	Non smokers	Total
Male	55(32.5%)	43(25.4%)	71(42.0%)	169
Female	0	0	311 (100%)	311
Total	**55 (11.5%)**	**43 (9.0%)**	**382 (79.6%)**	**480**

6.4.8 Age at initiation of smoking

Table 18 reveals that most of the smokers (63.3%) initiated their smoking at 15-24 years age group itself. 18.4% initiated during 25-30 and only15.3% started smoking above 30 years

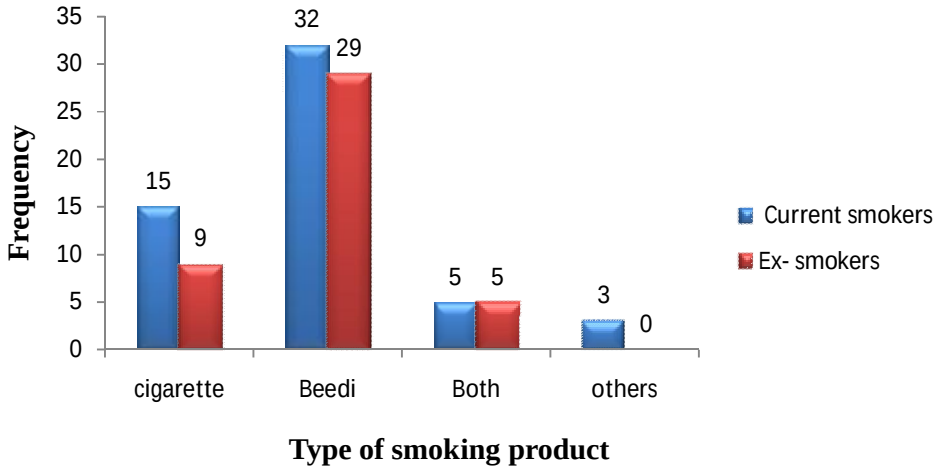
Table: 18 Distribution of smokers as per their age at initiation of smoking

Age at smoking	No.	Percentage among smokers
10-14 yrs	3	3%
15-19 yrs	23	23.5%
20-24 yrs	39	39.8%
25-30 yrs	18	18.4%
>30 yrs	15	15.3%
Total	**98**	**100%**

6.4.9 Distribution of type of smoking product

It is observed from Fig 10 that beedi smoking was predominant in both current and ex-smokers (58.2%Vs 67.4%) compared to cigarette smoking (27.3% Vs 20.9%).

Fig :10 Distribution of smokers according to type of smoking product



6.4.10 Percentage distribution of smokers according to pack years

Pack-yrs was calculated based on the formula-{No. of cigarettes smoked per day / 20 x duration of smoking}. Table 19 shows that 1-14 pack years of smoking was the commonest among smokers (57 out of 98) followed by others in descending order. Though current smokers predominate in all pack-yrs of smoking, when it comes to ≥ 50 pack-yrs, it was the ex-smokers who predominate (60% exsmokers Vs 40% current smokers).

Table:19 Percentage distribution of smokers according to pack years

		Smoking history		Total
		Current smokers	Ex-smokers	
Pack-years	1-14 years	32 (56.1%)	25 (43.9%)	57
	15-24 years	9 (56.3%)	7 (43.8%)	16
	25-49 years	12 (60.0%)	8(40.0%)	20
	≥ 50 years	2 (40%)	3 (60%)	5
	Total	**55**	**43**	**98**

6.4.11 COPD Scoring among smokers using IPAG questionnaire

Table: 20 shows that 43.9% of the smokers scored in favour of COPD (i.e 17 or more) and among these high scorers, current smokers accounted for 51.2% in comparison to 48.8% by ex- smokers.

Table: 20 Distribution of smokers according to COPD Score

COPD Scoring	Current Smokers		Ex smokers		Total	
	No.	Percentage	No.	Percentage	No.	Percentage
<17	33	60.0%	22	40.0%	55	56.1%
≥ 17	22	51.2%	21	48.8%	43	43.9%
Total	**55**	**56.1%**	**43**	**43.9%**	**98**	**100%**

6.5 Association of COPD with various factors

Table : 21 Cross tabulation between Age and COPD

Age group	COPD Present	COPD Absent	Total
30-39 yrs	10 (6.5%)	143 (93.5%)	153
40-49 yrs	24 (16.7%)	120 (83.3%)	144
50-59 yrs	28 (23.9%)	89 (76.1%)	117
≥60yrs	29 (43.9%)	37 (56.1%)	66
Total	**91 (19.0%)**	**389 (81.0%)**	**480**

Chi-square value= 44.550 (df = 3) P value = 0.000 (S)

In this study, it is noted from table 21 that increasing age is significantly associated with increased prevalence of COPD with P value =0.000

Table : 22 Cross tabulation between sex and COPD

Sex	COPD Present	COPD Absent	Total
Males	62 (36.7%)	107 (63.3%)	169
Females	29 (9.3%)	282 (90.7%)	311
Total	**91 (19.0%)**	**389 (81.0%)**	**480**

Chi-square= 53.356 (df=1) P value = 0.000 (S)

Table:22 shows that there was statistically significant difference in the prevalence of OPD among males and females i.e. males showing higher prevalence (36.7%) than females(9.3%)

Table:23 Cross tabulation between education and COPD

Education Level	COPD Present	COPD Absent	Total
Illiterate	39 (22%)	138 (78%)	177
1-5th	32 (24.6%)	98 (75.4%)	130
6-12th	20 (13.3%)	130 (86.7%)	150
Degree/ others	0	23 (100%)	23
Total	**91 (19.0%)**	**389 (81.0%)**	**480**

Chi-square= 12.267 (df=3) P value = 0.007 (S)

Table 23 shows that 22% of illiterates in the study population were having COPD. Among the literates, COPD prevalence was highest (24.6%) among primary schoolers i.e. 1-5th std and thereafter it decreases with increasing level of education. This difference was found to be statistically significant.

Occupation and COPD

As shown in Fig:3, majority of the study participants were coolies (either agricultural or non-agricultural coolies) and only 4 were involved in risky occupation. Hence occupation was not analysed with COPD

Table: 24 Cross tabulation between Socio Economic Status and COPD

SES	COPD Present	COPD Absent	Total
Class I	3 (9.4%)	29 (90.6%)	32
Class II	6 (11.5%)	46 (88.5%)	52
Class III	25 (15.6%)	135 (84.4%)	160
Class IV	34 (20.0%)	136 (80%)	170
Class V	23 (34.8%)	43 (65.2%)	66
Total	**91 (19.0%)**	**389 (81.0%)**	**480**

Chi-square value 15.900 (df=4) P value = 0.003 (S)

It is evident from table 24 that COPD prevalence was highest among class V (34.8%). This table also expresses a significant inverse relationship between COPD and socio economic status i.e. COPD prevalence decreases as socioeconomic class improves.

Table 25 Cross tabulation between smoking and COPD

Smoking status	COPD Present	COPD Absent	Total
Current smokers	27 (49.1%)	28 (50.9%)	55
Ex smokers	27 (62.8%)	16 (37.2%)	43
Non smokers	37 (9.7%)	345 (90.3%)	382
Total	**91 (19%)**	**389 (81%)**	**480**

Chi-square = 107.7 (df=2) P value = 0.000 (S)

It is seen from table 25 that Smokers had higher prevalence of COPD compared to non smokers. Among smokers, ex-smokers had higher prevalence than current smokers (62.8% Vs 49.1%). These differences were found to be highly significant

Table 26 Cross tabulation between Pack years of smoking and COPD

Pack years of smoking	COPD present	COPD absent	Total
Non smokers	38 (9.9%)	345 (90.1%)	383
< 20 pack years	27 (41.5%)	38 (58.5%)	65
≥ 20 pack years	26 (81.2%)	6 (18.8%)	32
Total	**91 (19%)**	**389 (81%)**	**480**

Chi-square value = 128.185 (df=2) P value = 0.000 (S)

Tobacco use among smokers was evaluated on accumulative basis expressed in pack-years. Table 26 shows that prevalence of COPD was significantly higher among those who smoked ≥ 20 pack-years when compared to those who smoked <20 pack-years (81.2% Vs 41.5%)

Table 27 Cross tabulation between COPD score and COPD among smokers

COPD score	COPD present	COPD absent	Total
Non smokers	37 (9.7%)	345 (90.3%)	382
Smokers (< 17)	23 (41.8%)	32 (58.2%)	55
Smokers (≥ 17)	31 (72.1%)	12 (27.9%)	43
Total	**91 (19%)**	**389 (81%)**	**480**

Chi-square value = 119.1 (df =2) P value = 0.000 (S)

Total number of smokers in the study population was 98. Out of this 98, 43 scored in favour of COPD i.e. ≥ 17 and 55 scored <17. Those who scored ≥ 17 had higher prevalence of COPD (72.1%) than those who scored <17 (41.8%). This difference was found to be statistically significant (table 27)

Table 28 Cross tabulation between Passive smoking and COPD among non smokers

Passive smoking	COPD Present	COPD Absent	Total
Yes	12 (9%)	121 (91%)	133
No	25 (10%)	224 (90%)	249
Total	**37 (9.7%)**	**345 (90.3%)**	**382**

Chi-square value= 0.103 (df =1) P value = 0.749 (>0.05) (NS)

Table 28 shows that there was no significant difference in the prevalence of COPD among those who exposed to passive smoking and those who do not. Most of the passive smokers i.e. 95/133 (71.4%) exposed to the smoke during adulthood. Among these, majority have exposed from husband 75(78.9%) followed by father in law- 2(2.1%) and others-18(18.9%).Others include son, son-in-law, brother etc.

Table 29 Cross tabulation between cooking fuel and COPD

Cooking fuel	COPD present	COPD absent	Total
LPG	25 (12%)	184 (88%)	209
Kerosene	1 (5%)	19 (95%)	20
Bio-fuels	56 (28.7%)	139 (71.3%)	195
LPG & Bio-fuels	9 (16.1%)	47 (83.9%)	56
Total	**91 (19%)**	**389 (81%)**	**480**

Chi-square value = 21.588 df = 3 P value = 0.000 (S)

Biomass fuels are cowdung, wood and coal. Table 29 shows that COPD prevalence was highest among biomass fuel users (28.7%) followed by both LPG & biomass users (16.1%), LPG alone (12%) and Kerosene fuel users (5%). This difference was found to be highly significant (P=0.000).

Table 30 Cross tabulation between average cooking hours per day and COPD

Cooking hours/day	COPD Present	COPD absent	Total
None	**59 (33.7%)**	**116 (66.3%)**	**175**
< 3 hours	20 (8.7%)	209 (91.3%)	229
≥ 3 hours	12 (15.8%)	64 (84.2%)	76
Total	**91 (19%)**	**389 (81%)**	**480**

Chi-square value = 40.880 (df=2) P value = 0.000 (S)

It is evident from table 30 that those who cooked for ≥ 3 hours/day had significantly higher prevalence of COPD (15.8% Vs 8.7%)

Table 31 Cross tabulation between ventilation and COPD

Ventilation	COPD present	COPD absent	Total
Adequate	10 (8.7%)	105 (91.3%)	115
Inadequate	81 (22.2%)	284 (77.8%)	365
Total	**91 (19%)**	**389 (81%)**	**480**

Chi-square value = 10.367 (df = 1) P value = 0.001 (S)

From table 31, it could be inferred that those who resided in houses with inadequate ventilation had significantly higher prevalence of COPD than those who resided in adequately ventilated houses (22.2% Vs 8.7%)

Table: 32 Past history of pulmonary TB and COPD

Past history of pulmonary TB	COPD present	COPD absent	Total
Present	3 (27.3%)	8 (72.7%)	11
Absent	88 (18.8%)	381 (81.2%)	469
Total	**91 (19%)**	**389 (81%)**	**480**

Chi square value = 0.507 df = 1 P value = 0.477(NS)

Table 32 shows that COPD prevalence was higher among those who had pulmonary TB in the past (27.3%) than those who didn't have (18.8%).But this difference was not statistically significant.

Table 33 Respiratory symptoms in relation to COPD

Symptoms		COPD Present	COPD Absent	Total	Chi-square value	P value
Chronic Cough	yes	30 (57.7%)	22 (42.3%)	51	56.948 (df=1)	0.000 (<0.05)
	No	61 (14.3%)	367 (85.7%)	419		
Chronic Sputum	Yes	29 (59.2%)	20 (40.8%)	48	57.471 (df=1)	0.000 (<0.05)
	No	62 (14.4%)	369 (85.6%)	422		
Breathlesness	yes	62 (33.2%)	125 (66.8%)	185	40.187 (df=1)	0.000 (<0.05)
	No	29 (9.9%)	264 (90.1%)	285		

Symptomatics (either having chronic cough, chronic sputum or dyspnoea) had significantly higher prevalence of COPD when compared to those who were not having any of these symptoms respectively with P value of 0.000 (shown in table 33).

Table 34 Cross tabulation between BMI and COPD

BMI	COPD Present	COPD absent	Total
< 18.5 kg/m^2	15 (31.9%)	32 (68.1%)	47
18.5 – 24.99 kg/ m^2	55 (20%)	220 (80%)	275
≥ 25 kg/m^2	21 (13.4%)	137 (86.7%)	158
Total	**91 (19%)**	**389 (81%)**	**480**

Chi-square value = 8.500 (df=2) P value = 0.014 (S)

Table 34 reveals that those with low BMI (<18.5kg/m^2) had significantly higher prevalence of COPD (31.9%) when compared to others.(P=0.014).

Table: 35 Multiple Logistic Regression Analysis.

Factors		Beta	S.E. of Beta	P-Value	Adiusted OR	95% C.I. for EXP(B)	
						Lower	Upper
Age Group	30 to 39 yrs*						
	40 to 49 yrs	1.292	0.480	0.007	3.640	1.421	9.325
	50 to 59 yrs	1.602	0.474	0.001	4.962	1.959	12.568
	60 yrs& above	1.627	0.530	0.002	5.088	1.800	14.385
House type	Pucca*						
	Kutcha	-0.264	0.456	0.562	0.768	0.314	1.878
	Semi pucca	0.928	0.359	0.010	2.530	1.251	5.116
Smoking History	Non smoker*						
	Current smoker	2.364	0.640	0.000	10.633	3.036	37.248
	Ex smoker	2.931	0.687	0.000	18.742	4.880	71.980

Variables marked with * was taken as reference category.

MLR results (table 35) shows that the factors causing COPD after controlling the effect of other variables are advancing age group, residing in semipucca house and smoking. The Odds of having COPD in the age group 40 – 49 years, when compared to 30 – 39 years is 3.64 times higher with (95% CI: 1.42 – 9.32) and it is statistically significant (P=0.007). Similarly, the odds for 50 -59 years is 4.96 (95% CI: 1.96 – 12.57) and 60 or more years is 5.10 (95% CI:

1.80 – 14.38) times higher when compared to 30 – 39 years age group. These Odds are also statistically significant. The odds of having COPD for those residing in semipucca house when compared to pucca house is 2.53 (95% CI of 1.251- 5.116) times higher significantly. Similarly, when compared to non smokers, current and ex-smokers have 10.63 and 18.74 times higher odds of having COPD respectively with significant P value of 0.000.

DISCUSSION

7. DISCUSSION

This community based cross sectional study was done to estimate the prevalence of COPD among adults aged 30 years and above and also to find out associated risk factors of COPD like smoking, environmental tobacco smoke exposure, exposure to biomass fuels etc among them. This study was carried out in selected panchayat villages of Ellapuram block of Thiruvallur district.

This study included 480 adults of which 169 (35.2%) were males and 311(64.8%) were females. Majority of the study population were Hindus (94.4%). Based on modified BG Prasad's class for socio economic status, majority of them belonged to class III-V (33.3%, 35.4% and 13.8% respectively) followed by 17.5% together in class I & II. 54.4% were coolies.

To find out the prevalence of COPD, peak flow meter was used and the predicted values were constructed for each individual based on their age & height using prediction models for Indians by Rajendra Prasad etal. [98] Those having predicted values less than 80% were diagnosed as COPD as this cut-off value has a sensitivity of 91% and specificity of 82%. in diagnosing COPD as per a study by Jackson H etal.[101]

According to the present study findings, mean Peak Expiratory Flow Rate (PEFR) among males was significantly higher (401.13) than the mean PEFR of females (306.37). The similar findings were reported by two other Indian studies namely Singh HD and Pero [104] and Jain SK etal.[105] Singh HD and Pero tabulated the PEFR values from number of Indian studies and found that Indian males had a

mean PEFR of 500 Litres/min (450-550 lpm) in contrast to Indian females who had mean PEFR of only 395 litres/min (320-470 lpm).

The negative correlation of age with Peak Expiratory Flow Rates and positive correlation with height found in this study is consistent with earlier studies by V.K.Vijayan etal [106] Udwadia FE etal.[107] Both the studies were done in Chennai.

Prevalence of COPD

There are conflicting prevalence estimates in the published literature. This is mainly due to differences in methodology and definitions used to measure the disease. For example: use of methodologies like physician diagnosed COPD, self reported symptoms, respiratory symptoms, measurement of airflow limitation etc. All these methods have their own advantages and limitations when it comes to field application with different sensitivities and specificities to diagnose COPD and also the costs. However, for epidemiological purposes ,measurement of airflow limitation with either a Peak flow meter or spirometer remains the most useful tool to asses COPD. It is also evident from studies[108] that diagnosis of airflow limitation along with advice to stop smoking increases the cessation rates among smokers thereby reducing the progression of the disease. Hence peak flow meter was used in the present study and spirometry was not used because of its high cost and practical difficulties in its field application such as complex and time consuming procedure with the requirement of maximal patient efforts.

In this study, 91 (19%) were identified as having COPD which is almost similar to the pilot study prevalence of 22% done among the same study population before the conduct of the present study.

Giovanni viegietal [57] reported a similar prevalence of 18.3% in his study conducted among adults > 25 years in rural area of north Italy in 2004.This prevalence was based on clinical criteria.

In Upsala, a study involving adults aged 40 and above by Danielsson P etal[82] in 2011, found almost similar prevalence of 16.2%.

Many Indian field studies done upto 1995 [17,18,39,44,45-51] had reported very low prevalence of COPD ranging from 2% to 9%.when compared to the present study. For example : Thiruvengadam etal[17] reported a prevalence of 1.9% in males and 1.2% in females in Chennai, Jindal etal[39] in rural north India found 5% prevalence in males & 2.7% in females, Viswanathan& singh[49] found a prevalence of 8% in males whereas a study in rural north India by Malik [51] showed a prevalence of 9.4 % in men & 4.9% in women. The difference in prevalence estimates between these studies and the present study could be due to various reasons like.

1) **Differences in methodology :**

   For ex: most of the earlier studies in India had used questionnaire alone.[18,47-49] whereas the present study used peak flow meter in addition to the questionnaire .For epidemiological studies, it is appropriate to use both the questionnaire and measuring tool for airflow limitation as it may lower the false positive rates of patient identification associated with either tool individually.[109] Moreover, the problem of misdiagnosis may occur with the surveys based on questionnaire alone. This problem of misdiagnosis depends on two factors. One is the structure and inherent properties of the questionnaire, and the other is the social, demographic and medical factors of the population being studied.

2) **Differences in definition criteria**:

Earlier studies[100] had attempted to separate the chronic bronchitis simple from chronic bronchitis with airways obstruction . But the term COPD includes both due to the pitfalls of separate definitions.[19] Moreover according to GOLD guidelines,[2] breathlessness - a manifestation of airflow obstruction, is also one of the diagnostic criteria for COPD. But many earlier studies in India[17,18,44,47-49] diagnosed COPD based on the definition of chronic bronchitis only(cough on most of the days for 3 months in a year for 2 consecutive years) thereby missing the breathlessness component i.e. airflow limitation. But the present study diagnosed COPD based on peak flow meter which measures the airflow limitation (i.e including both the components of CB,S & CB, AO) thereby contributing to the increased prevalence of COPD. It is also proved by the fact that few earlier Indian studies which used peak flow meter(a study by Radha etal in urban Delhi[44] and a study in rural north India by Malik[51] showed relatively higher prevalence of COPD when compared to studies that used questionnaire alone.[18,47-49]

3) Varied age groups recruited by different studies. For ex: Wig etal[46] included 0-55+ yrs, 0-70+yrs by Viswanathanetal,[47] 5-60+ by Thiruvengadam etal,[17] 3-60+ by Radha etal,[44] 15-65+ by Malik[51] etc. whereas the present study included the age group of 30 and above. It is evident that COPD is uncommon in younger age group and the inclusion of this age group will dilute the true prevalence thereby accounting for the lower prevalence in the above said studies.[19]

4) Rural-urban differences also play a major role because of the different rates of exposure to the risk factors.

5) There are studies on North-south differences in prevalence estimates. Higher prevalence estimates had been noted in south India (Tamil Nadu) in previous studies as well. [18]

6) Moreover, these studies in India were conducted before 1990 and hence the high prevalence of the present study could be attributed to changes in lifestyle like increased prevalence of both active and passive smoking , increased environmental pollution, increased use of chemical pesticides & fertilisers in agriculture which is also an air pollutant. Because of the alarming and growing evidences that smoking rate is steadily increasing among Indians, it is expected that COPD prevalence rate also increases justifying the higher prevalence of the present study.

7) Prevalence of COPD in the present study was also considerably higher than the prevalence of 9% in males & 5% in females reported by previous studies in India[39,51] that used identical diagnostic criteria i.e peak flow meter. This could be due to the fact that prediction models for peak flow meter used in these studies were the one designed by Malik in 1975[110] and Ray D in 1993[18] in contrast to the present study. The present study used the latest prediction model for Indians by Rajendra Prasad etal[98] in 2006. Moreover, the abovesaid two studies were conducted in 1990s—almost two decades back. There are no recent studies on COPD in India using peak flow meter to compare the prevalence estimates of the present study.

Age and COPD

In the present study the prevalence of COPD was highest among 60 years and above (43.9%) and lowest among 30–39 years (6.5%). It has also been observed that increasing age was significantly associated with higher prevalence of COPD

(P value is 0.000). This finding is consistent with the reports by other studies namely, a large population based study conducted in China by NanshanZhongetal[81] reporting a p value of <0.0001, a study by Waked M etal among Lebanon adults [111] with adjusted odds of 1.05, a prospective study on COPD by Ray D etal[18] in rural south India, a community based cross sectional study on COPD in rural India by SundeepSalvi etal[52] (OR of 2.01)and a multicentric study in India by Jindal etal.[19] Though the younger age group had a lesser prevalence compared to older age(60 and above), it is of public health importance as the younger age will be continuously exposed to the risk factors.

Sex and COPD

The present study found a significant higher prevalence of COPD among males than females (36.7% Vs 9.3%, P value=0.000. A study by Jindal SK etal[19] in India, NanshanZhong etal[81] in China and SundeepSalvi etal[52] also found the similar findings.

Socioeconomic status and COPD

Lower the socio economic status higher the prevalence of COPD was the observation made in the present study with a significant P value of 0.003. The lowest social class (Class V) had a prevalence of 34.8%but it was only 9.4% among the highest class (Class I). Factors like increased usage of biomass fuel for cooking , poorly ventilated housing, overcrowding etc., could make the lower socio economic class people more vulnerable to the disease. The similar findings have been reported by Viegi G etal[28] and few other studies.

Cooking fuel and COPD

As mentioned earlier exposure to biomass fuels (cowdung /wood/coal) is a independent risk factor with special to females. 52.3% of the study population were using biomass fuels for cooking either alone (40.6%) or in combination with LPG (11.7%). In the present study, prevalence was significantly more among biomass fuel users (28.7%) than those using other fuels (5% in kerosene users, 12% in LPG users and 16.1% in both LPG and biomass users) with a P value = 0.000. Similar findings has been documented in many studies. A meta analysis on risk of COPD from biomass exposure by Guoping Hu etal in 2010[112] found an higher odds (OR-2.44 with 95% confidence interval of1.9 to 3.33) of developing COPD for those exposed to biomass, relative to those not exposed. Ekici et al[113] did a comparative study on chronic airway diseases among non-smoking women of 40 years or more .They split the study subjects into 2 groups based on the presence or absence of exposure to biomass cooking in Turkey;).Their findings proved that biomass smoke pollution is a predominant contributing factor for the development of chronic airway diseases in non-smoking women in rural area. Also, a study by Shengming Liu etal[34] in rural south china and by Goel S etal in India in 2007[114] showed a significant association between COPD and exposure to biomass fuel for cooking.

Average cooking hours/day and COPD

Studies have shown that COPD prevalence increases with increasing hours-years of biomass exposure.[20,62] In the present study, only women were involved in cooking and thus exposed to biomass fuel. Though hours-years of exposure was not calculated, same trend was seen in the present study i.e those cooking for >3hrs/day

had a higher prevalence of 15.8% compared to those cooking < 3 hrs/day. Similarly, a study by Priscilla Johnson etal[53] among rural women of Tamilnadu reported two times higher prevalence of COPD in women involved in cooking for >2 hrs/ day in kitchen.

Ventilation and COPD

In the present study, inadequate ventilation was significantly associated with the development of COPD (prevalence of 22.2% in poorly ventilated houses Vs 8.7% in adequately ventilated houses). This finding is agreeable with the findings of study in Chinese rural area by Ran PX et al [33] who reported a odds ratio of 1.97,95% CI = 1.06 – 2.03 for worse ventilation.

Smoking status and COPD

There were no female smokers in the present study. Among 98 male smokers, 55 were current smokers and 43 ex-smokers .Smokers had a higher prevalence of 55.1% compared to non smokers (9.7%). This difference was noted to be highly significant (P value = 0.000). Among the smokers, ex smokers showed a higher prevalence of 62.8% than current smokers (49.1%).The present study finding of significant association between smoking and COPD has been consistently observed in many studies. Smoking as an etiology of COPD has been proved in many international reports.[4, 20,62] COPD was five times more common in smokers as per the NHANES III survey**.** Sundeepsalvi etal [52] in his study, reported a higher odds(OR of 2.34) of developing COPD for smokers. .Almost half of the current smokers (49.1%) had COPD in the present study similar to 46.6% reported by Vandevoorde J etal[64] in a case finding study in general practice in 2007. Tobacco use

among smokers was evaluated on accumulative basis expressed in pack-years. The present study identified a significant association of COPD with smoking exposure of >20 pack-yrs similar to a study by Ohar JA etal in 2010.[115]

Symptoms and COPD

In general, symptomatics had significantly higher prevalence of COPD i.e. 64(33.5%) neccessiating the need for community based screening programme.

COPD scoring for smokers and COPD prevalence

International Primary Airways Group (IPAG) has given a COPD scoring for smokers based on age, pack-years of smoking, respiratory symptoms, BMI etc., and a score of ≥17 was suggested as having high diagnostic value.[94] The present study used the same scoring for smokers and findings was consistent with IPAG cut off value i.e COPD prevalence was significantly higher (72.1% among those who had scoring ≥ 17, compared to 41.8% among scorers of <17 with P value of 0.000

BMI and COPD

The present study also made an statistically significant observation that lower the BMI higher the risk of developing COPD (with P value of 0.014). Those with lower BMI (<18.5Kg/m^2) had a higher prevalence of 31.9% followed by 20% and 13.4% among normal and high BMI holders respectively. Many researchers documented similar findings. A study by Lokke A etal among high risk adults of >35 yrs in Denmark,[36] a study by N.K. Jain etal in Jaipur, India [72] with mean BMI of 18.36 for males and 17.53 for females showed p value of <0.0001**, a** study by Biswajit Chakrabarti1 etal[116] among >35years adults in rural west Bengal and a

study by NanshanZhongetal in china[81]. Harik-Khan etal[117] found a relative risk of 2.76 for developing COPD for the lowest BMI tertile compared to the highest tertile in men.

Other risk factors

In contrast to earlier data, no significant association was seen between low level of education, passive smoking, past history of pulmonary TB and COPD in the present study.

SUMMARY

8. SUMMARY

A population based cross sectional study was done to find out the prevalence of Chronic Obstructive Pulmonary Disease and its risk factors like tobacco smoking, environmental tobacco smoke exposure, exposure to biomass fuel, etc among adults aged 30 years and above in Ellapuram block of Thiruvallur district, Tamilnadu.

A semistructured pretested questionnaire was used to collect information regarding the socio-demographic details, risk factor exposure and symptoms. Height, weight and Peak Expiratory Flow Rate(PEFR) were measured. Those with PEFR < 80% of the predicted value were considered as having COPD. Predicted PEFR values were calculated separately for males and females based on their age and height using peak expiratory prediction model for Indians suggested by Rajendra Prasad etal in 2006.[98]

The study revealed the following findings:

In our study population, 91(19%) were found to have COPD. Prevalence was significantly higher among males (36.7%) compared to females (9.3%)

The mean PEFR was significantly higher among males (401.13) in comparison to females (306.37). There was negative correlation between age and PEFR and positive correlation with height.

Increasing age and male sex was significantly associated with the development of the disease with p value of =0.000. Lower the socio economic status

higher the prevalence of COPD was the observation made in the present study with a significant P value of 0.003.

The prevalence of COPD among those exposed to biomass smoke was the highest (28.7%) followed by exposure to both biomass and LPG (16.1%) and exposure to LPG alone(12%). This difference was found to be highly significant (P value = 0.000). Similarly, those involved in cooking for > 3 hours / day had significantly higher prevalence of COPD (15.8%) than those involved for <3 hours / day (8.7%) with a p value of 0.0001

Similar to other studies, the present study also found a extremely significant association between smoking and COPD (P value=0.000). Among the smokers, those who smoked >20 pack-years had a significant higher prevalence of COPD compared to <20 pack-years smokers (81.2% Vs 41.5%)

All respiratory symptoms like chronic cough, chronic sputum and persistent and progressive dyspnoea were significantly associated with the development of COPD.

COPD scoring was done for smokers. COPD prevalence was significantly higher among those who scored in favour of COPD i.e.≥ 17.

COPD was highly prevalent among those with low body mass index compared to those having normal BMI as documented in many Indian as well as international studies.

All other factors like low education level, passive smoking, past history of pulmonary TB were not significantly associated with COPD in the study group.

Thus, this study establishes the fact that COPD is highly prevalent among adults in rural area which is mainly due to tobacco smoking and biomass exposure. For practitioners, the results call for a high index of suspicion of COPD in persons aged 30 years and above with substantial exposure to risk factors especially in underweight individuals. For health policy makers, the present study findings urge the development of preventive programs failing which the burden of COPD increases resulting in increased mortality, morbidity and economic burden. The baseline prevalence information provided in this study also paves the way for future cross-sectional studies that can be used to evaluate an intervention or to make comparisons with other populations to frame an intervention especially for biomass exposure.

LIMITATIONS

9. LIMITATIONS

1) Spirometry, the gold standard diagnostic tool for COPD, was not used in this study due to impracticality and non affordability. Alternatively, peak flow meter with cut-off value having 91% sensitivity and 82% specificity in diagnosing COPD was used.

2) The diagnostic criteria for COPD based on Peak expiratory flow rate (PEFR) can be questioned among elderly individuals as PEFR may be normally reduced in these people as a function of aging. However this problem can also be encountered while using gold standard (spirometric) definition of FEV1/FVC less than 70% [118]

3) Though the present study used IPAG questionnaire to rule out asthma clinically, it did not asses IgE level or bronchodilator reversibility to distinguish asthma from COPD.

4) The present study was done among adults of rural area only which limits the generalizability of the findings to the urban areas.

RECOMMENDATIONS

10. RECOMMENDATIONS

The following are the recommendations from the findings of the study.

1) The higher prevalence noted in this study highlights the need for enhanced community based screening programme for secondary prevention of COPD among adults.

2) Almost 52.3% of the study population were using biomass fuel either alone or in combination with other fuels and exposure to this biomass was found to be significant risk factor of COPD. Hence attention should be focussed on encouraging the use of cleaner fuels, improved stoves which reduces the smoke considerably and on adequate ventilation. But it needs combination of public policy, national resources, cultural changes and community participation.

3) Apart from this, there is a need for awareness programme among the people regarding the use of chimneys, changes in behaviour like drying wood before using it as a fuel and using a lid for the cooking utensil while cooking so as to increase the combustion efficiency.

4) As substantial proportion of asymptomatics (9.3%) too had COPD, health education regarding risk factor reduction should be paid attention i.e. resources should be aimed at smoking cessation etc. Cessation facilities need to be widely available and adequately publicised.

5) Almost 50% of the smokers in the study population had COPD and they were still smoking, therefore at increased risk of progression to more severe disease. Early diagnosis and prompt intervention in this population is very important as it is evident that diagnosis of airflow obstruction may help to optimise smoking cessation.

6) Substantial proportion of the smokers in the study population initiated its use in early ages (15-24) and hence the prevention programme especially needs to address the adolescents..

7) There is a need for further studies to explore the role of nutritional factors in the development of COPD as low BMI was also significantly associated with COPD. Intake of adequate diet should also be emphasised .

8) There is a need for uniform standards for diagnosing COPD in epidemiological surveys.

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ANNEXURES

ANNEXURE I

INFORMATION SHEET

Title of Dissertation

A Cross sectional study on Chronic obstructive pulmonary disease (COPD) among adults aged 30 years above in Ellapuram Block, Thiruvallur District, Tamilnadu, 2012.

COPD is one of the chronic respiratory diseases with high mortality and morbidity worldwide. In India, at present, approx 8-10% of the adult population are affected by the disease. But it is said that prevalence is increasing especially in developing countries like India due to increased use of biomass fuels, tobacco smoking etc.

Many die due to its complications like respiratory or cardiac failure. These complications and subsequent deaths can be prevented by early diagnosis and prompt intervention like treatment, stopping exposure to risk factors.

The purpose of this study is to diagnose cases of COPD easily with the help of certain special tests. We request you to participate in the study and we ensure that the privacy of your details given in the research will be maintained confidentially throughout the study. In the event of any publication or presentation resulting from the research, no personally identifiable information will be shared.

Taking part in this study is voluntary. You are free to decide whether to participate in this study or to withdraw at any time. Your decision will not result in any loss of benefits to which you are otherwise entitled.

The results of the study may be intimated to you at the end of the study period or during the study if anything is found abnormal which may aid in the management or treatment.

Signature of investigator Signature of Participant

தகவல் தாள்

தமிழ்நாட்டில், திருவள்ளூர் மாவட்டம், எல்லாபுரம் பகுதியில் வசிக்கும் 30 வயதுக்கு மேற்பட்ட ஆண்/பெண் இரு பாலினர்களிடமும் சுவாசக்குழாய் அடைப்பு சம்பந்தமான நோயின் **(COPD)** பாதிப்பு குறித்த ஆய்வு.

COPD என்பது நுயைீரல் சம்பந்தமான நோய்களில் ஒன்று உலகளவில் இந்த நோய்க்கு, அதிகப்படியான உயிரிழப்பும் உடல் பாதிப்பும் ஏற்படுகிறது. இந்தியாவில் தற்போது சுமார் 8–10 சதவிகீதம் வரையிலான மக்கள் இந்த நோயால் பாதிக்கப்பட்டுள்ளனர். மேலும், இந்த நோயால் பாதிக்கப்படுவரின் எண்ணிக்கை அதிகாரிக்கப்போவதாக உலக சுகாதார அறிக்கை குறிப்பிடுகிறது – (குறிப்பாக இந்தியா போன்ற வளர்ச்சி அடையும் நாடுகளில்). இந்நாடுகளில், குறிப்பாக கிராமபுரங்களில், அதிகப்படியாக பயன்படுத்துப்படும் சமையல் எரிவாயுவான விறகு / மாட்டுச்சானம் / இலைகள் போன்றவைகளிலிருந்து வெளியேறும் புகையினாலும், புகைபிடிக்கும், பழக்கத்தினாலும் இந்நோய் அதிகரிக்கிறது.

இந்த நோயின் பின்விளைவுகளான நுரையீரல் மற்றும் இருதய செயலிழப்பால் அதிக மக்கள் இறக்கின்றன. ஆரம்ப கட்டத்திலேயே இந்த நோயை கண்டறிந்து, உரிய சிகிச்சை வழங்குவதினால், இவ்வாறான பின்விளைவுகளையும், உயிரிழப்புகளையும் தவிர்க்கலாம், சில சிறப்பு பரிசோதனைகளின் மூலம் (பீக் புளோ மீட்டர் கருவி) **(Peak Flow Meter)** இந்த நோயை எளிதில் கண்டுபிடித்த ஆராயமுடியும் என்பதே இந்த ஆராய்ச்சியின் நோக்கமாகும்.

நீங்களும் இந்த ஆராய்ச்சியில் பங்கேற்க விரும்புகிறோம். இந்த ஆராய்ச்சியில் தங்களது நோயின் ஆய்வறிக்கையோ அல்லது சிகிச்சையோ பாதிப்புக்கு ஏற்படாது என்பதையும் தெரிவித்துக் கொள்கிறோம்.

இந்த ஆராய்ச்சியின் முடிவுகளை மற்றும் கருத்துக்களை வெளியிடும் போதோ அல்லது ஆராய்ச்சியின் போதோ, தங்களது பெயரையோ அல்லது அடையாளங்களையோ வெளியிட மாட்டோம் என்பதையும் தெரிவித்துக் கொள்கிறோம்.

இந்த ஆராய்ச்சியில் பங்கேற்பது தங்களுடைய சொந்த விருப்பத்தின் பேரில் தான் இருக்கிறது. மேலும் நீங்கள் எந்நேரமும் இந்த ஆராய்ச்சியிலிருந்து விலகலாம் என்பதையும் தெரிவித்துக் கொள்கிறோம்.

இந்த சிறப்பு பரிசோதனைகளின் முடிவுகளை, ஆராய்ச்சியின் போதோ அல்லது ஆராய்ச்சியின் முடிவின் போதோ தங்களுக்கு தெரிவிக்கப்படும் என்பதையும் தெரிவித்துக் கொள்கிறோம்.

ANNEXURE II

INFORMED CONSENT FORM

Title of the Dissertation:

A CROSS SECTIONAL STUDY ON PREVALENCE OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE AMONG ADULTS AGED 30 YRS AND ABOVE IN ELLAPURAM BLOCK OF THIRUVALLUR DISTRICT, TAMILNADU, 2012

Name of the Participant: Age/Sex:

Name of the Participant's Parent: Age/Sex:

Participant ID : Date:

(1) I have been explained in detail about the study and its procedure. I confirm that I had completely understood the study and have had the opportunity to ask questions.

(2) I understand that my son/daughter's participation in the study is voluntary and that my son/daughter is free to withdraw at any time, without giving any reason, without their medical care or legal rights being affected.

(3) I understand that the principal investigator, others working on the investigator's behalf, the Ethics Committee and the regulatory authorities will not need my permission to look at my son/daughter's health records both in respect of the current study and any further research that may be conducted in relation to it, even if they withdraw from the trial. I agree to this access. However I understand that my identity or my son/daughter's identity will not be revealed in any information released to third parties or published.

(4) I agree not to restrict the use of any data or results that arise from this study provided such a use is only for scientific purpose(s).

(5) I agree to my son/daughter taking part in the above study.

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Name of the Participant	Signature or thumb impression of the Participant
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Name of the investigator	Signature of the investigator

ஒப்புதல் கடிதம்

தமிழ்நாட்டில், திருவள்ளூர் மாவட்டம், எல்லாபுரம் பகுதியில் வசிக்கும் 30 வயதுக்கு மேற்பட்ட ஆண்/பெண் இரு பாலினர்களிடமும் சுவாசக்குழாய் அடைப்பு சம்பந்தமான நோயின் **(Chronic Obstructive Pulmonary Disease - COPD)** பாதிப்பு குறித்த ஆய்வு.

பெயர் : வயது / பாலினம்

சேர்கை எண் : தேதி :

இந்த ஆராய்ச்சியின் விவரங்களைக் கொண்ட, தகவல் தாளைப் பெற்றுக் கொண்டேன்.

இந்த ஆராய்ச்சியின் விவரங்களும், அதன் நோக்கமும் முழுமையாக எனக்கு தெளிவாக விளக்கப்பட்டது.

எனக்கு விளக்கப்பட்ட விஷயங்களை, நான் புரிந்து கொண்டு எனது சம்மதத்தைத் தெரிவிக்கிறேன். எனக்கு, பீக் புளோ மீட்டர் **(Peak Flow Meter)** என்ற கருவியின் மூலம் நுரையீரலை பரிசோதனை செய்துக் கொள்ள சம்மதம்.

இந்த ஆராய்ச்சியில், பிறரின் நிர்பந்தமின்றி, என் சொந்த விருப்பத்தின் பேரில் தான் பங்கு பெறுகிறேன். மற்றும் இந்த ஆராய்ச்சியில இருந்து எந்நேரமும் விலகலாம் என்பதையும், அதனால் எந்த பாதிப்பும் ஏற்படாது என்பதையும் நான் புரிந்து கொண்டேன்.

நான் என்னுடைய சுய நினைவுடனும் மற்றும் முழு சுதந்திரத்துடனும் இந்த மருத்துவ ஆராய்ச்சியில் என்னை சேர்த்துக் கொள்ள சம்மதிக்கிறேன்.

ஆராய்ச்சியாளர் மற்றும் அவரைச் சார்ந்தவர்களோ, நெறிமுறைக்குழு உறுப்பினர்களோ நான் இந்த ஆராய்ச்சியில் இருந்து விலகினாலும், என்னுடைய அனுமதியின்றி எனது தகவல்களை, இந்த ஆராய்ச்சிக்கோ, இது தொடர்பான வேறு ஆராய்ச்சிகளுக்கோ, பயன்படுத்திக் கொள்ள முடியும் என்று புரிந்து கொண்டு சம்மதம் அளிக்கிறேன். ஆனாலும் என்னுடைய அடையாளம் வெளியிடப்படமாட்டாது என்று புரிந்து கொள்கிறேன்.

இந்த ஆராய்ச்சியின் தகவல்களையும், முடிவுகளையும், அறிவியல் நோக்கத்திற்காக பயன்படுத்துவதற்கு நான் அனுமதிக்கிறேன். நான் இந்த ஆராச்சியில் பங்கு பெற முழுமனதுடன் சம்மதிக்கிறேன்.

பங்கேற்பவரின் பெயர் பங்கேற்பவரின் கையொப்பம்
(அல்லது) கட்டைவிரல் ரேகை

ஆய்வாளரின் பெயர் ஆய்வாளரின் கையொப்பம்

சாட்சியின் பெயர் சாட்சியின் கையொப்பம்

இடம் : தேதி :

ANNEXURE III

QUESTIONNAIRE

A) SOCIO DEMOGRAPHIC DETAILS:

1) Name :

2) Age :

3) Sex :

4) Religion : ☐Hindu ☐Christian ☐ Muslim ☐Others

5) Address :

6) Education :
- ☐ Illiterate
- ☐ I - V Std
- ☐ VI – XII Std
- ☐ Degree
- ☐ PG Degree
- ☐ Others

7) Occupation :
- ☐ Housewife
- ☐ Coolie
- ☐ Agricultural
- ☐ Carpenter
- ☐ Welding
- ☐ Industrial Worker
- ☐ Others (if, specify type of industry, Protection offered)

8) Total monthly income of the Family : _____

9) Total members of the Family : _____

10) Type of House :
- ☐Kutcha
- ☐Semipucca
- ☐Pucca
- ☐Others

11) No. of rooms in the house : ☐One ☐Two

☐ Three ☐ Four

B) HISTORY REGARDING EXPOSURE TO RISK FACTORS:

i) Indoor Air Pollution

12) Do you have separate kitchen in your house : ☐Yes ☐No

13) What type of fuel used for cooking? :

☐LPG

☐Kerosene

☐Solid Fuels (Cow Dung, Coal, Wood)

☐Both LPG & biomass

☐Others

14) Do you self Cook? : ☐Yes ☐No

15) If yes, total duration of cooking in life so far :

☐< 10 yrs

☐10 - 15 years

☐> 15 yrs

16) Average Hours of Cooking per day : ☐< 3 hrs ☐> 3 hrs

17) Adequate ventilation in the kitchen : ☐Present ☐Absent

ii) Smoking History:

18) Are you a,

☐ Current Smoker

(or)

☐ Ex-Smoker (Smoked atleast one cigarette per day for one year and stopped smoking for more than a month)

(or)

☐ Non Smoker

19) If Current or Ex-Smoker,

a) What do you / did you use : ☐Cigaratte ☐Beedi ☐Both ☐Others

b) Starting age of smoking :

c) How many cigar/beedi per day? :

d) Smoking for how long? :

20) Have you exposed to passive smoking : ☐Yes ☐ No

21) If yes,

a) exposed from whom? :

b) exposed in childhood/adulthood/both :

iii) Outdoor Air Pollution:

22) Any industry near by your residence : ☐Yes ☐No

iv) Did u have pulmonary TB in the past ? : ☐Yes ☐No

C) TREATMENT HISTORY:

23) Are you on any respiratory treatment currently? : ☐Yes ☐No

D) HISTORY REGARDING COPD SYMPTOMS:

24) Are you having chronic cough ? : ☐Yes ☐No

Asses by asking following three questions

24A. Are there months in which you cough on most days? : ☐Yes ☐No

*[If **yes**, ask both Questions 24B & 24C; If **no**, skip to Question 26]*

24.B. Do you cough on most days for as much as three months each year? : ☐Yes ☐No

24.C. For how many years have you had this cough? : Less than 2 years ❑
2-5 years ❑
More than 5 years ❑

If **yes,** to all three questions, mark chronic cough as **YES** or otherwise , mark it as **NO**

25) If cough present, does weather affect your cough? : ☐Yes ☐No

26) Do you have chronic sputum production ? : ☐Yes ☐No

Asses by asking following three questions

26A. Are there months in which you have this sputum on most days? Yes ❑
*[If **yes**, ask both Questions 26B & 26C; If **no**, skip to Question 27]* No ❑

26.B. Do you bring up this sputum on most days for as much as three months each year? Yes ❑
No ❑

26.C. For how many years have you had this sputum? Less than 2 years ❑
2-5 years ❑
More than 5 years ❑

If **yes,** to all three questions, mark chronic sputum as **YES** or otherwise , mark it **NO.**

27) Do you cough up sputum as 1st thing in the morning?: ☐Yes ☐No

28) Do you produce sputum in absence of cold? : ☐Yes ☐No

29) Do you have breathing difficulty ? : ☐Yes ☐No

30) If yes, (based on Modified Medical Research Council questionnaire for assessing severity)

Do you get breathless with strenuous exercise? : ☐Yes ☐No

(or)

Do you get breathless while walking up flight of stairs : ☐Yes ☐No

(or)

Do you stop for breath when walking on own pace on the level: ☐Yes ☐No

(or)

Do you stop for breath after walking 100 mts/

few minutes on the level : ☐Yes ☐No

(or)

Do you become breathless even while dressing/undressing : ☐Yes ☐No

b) Is it present every day? : ☐Yes ☐No

c) Is it getting worse over time? : ☐Yes ☐No

d) Have u ever been hospitalized for breathing problem? : ☐Yes ☐No

31) Do you wheeze? : ☐Yes ☐No

E) HISTORY TO RULE OUT ASTHMA:

1. Do you have any allergy to dust/pollen? ; ☐Yes ☐No

2. In last 1 year, have you woken up at night at any time due to –

- attack of cough ☐Yes ☐No
- feeling of chest tightness: ☐Yes ☐No
- breathing difficulty : ☐Yes ☐No

F) COPD SCORING - For Smokers based on symptoms and risk factors as per international primary care airways group (2005) – a guide for primary care physicians.

If smoker and no prior diagnosis of respiratory disease / not on any respiratory treatment		
Question	**Response Choices**	**Points**
1. What is your age in years?	40-49 years 50-59 years 60-69 years 70 years or older	0 4 8 10
2. No. of cigarettes smoked per day (ex-smoker) or No. of cigarettes smoking per day currently. (Current smoker)_____ Total duration of smoking in years. _____ Packs per day = cigarettes per day/ 20 per pack Pack-years = packs per day X years smoked	0-14 pack-years 15-24 pack-years 25-49 pack-years 50+ pack-years	0 2 3 7
3. Weight in kilograms _____ Height in meters _____ BMI = weight in kg/(height in m)2	BMI < 25.4 BMI 25.4-29.7 BMI > 29.7	5 1 0
4. Does the weather affect your cough?	Yes No I do not have a cough	3 0 0
5. In the absence of cold, do you produce sputum while coughing.	Yes No	3 0
6. Do you usually cough up phlegm (sputum) from your chest first thing in the morning?	Yes No	0 3
7. How frequently do you wheeze?	Never Occasionally or more often	0 4
8. Do you have or have you had any allergies?	Yes No	0 3
Total Score		

F) CLINICAL EXAMINATION:

Height : --------- cms

Weight : ---------- kg

Peak Expiratory flow rate

a) Predicted Value	b) Observed Value	c) % of Predicted Value (b/a x 100)	d) Inference

வினாப்பட்டி

1. பெயர் :
2. வயது :
3. பாலினம் :
4. மதம் : அ) இந்து ஆ) முஸ்லீம்
   இ) கிறிஸ்துவம் ஈ) இவை அல்லாதது
5. முகவரி :
6. படிப்பு : அ) படிப்பறியாது ஆ) முதல் – ஐந்தாம் வகுப்பு
   இ) ஆறு – பனிரெண்டுவகுப்பு ஈ) பட்டதாரி
7. தொழில் :
8. குடும்பத்தின் மாத வருமானம் என்ன? :
9. குடும்பத்தில் எத்தனை உறுப்பினர்கள்? :
10. வீட்டின் வகை

    அ) முழுமையாக கூரை அல்லது ஓலை வீடு

    ஆ) சுவர் மட்டும் கல்லினால் உருவாக்கப்பட்டது (மற்றவை கூரை அல்லது ஓலை)

    இ) முழுமையாக சிமெண்ட் வீடு
11. வீட்டில் உள்ள அறைகள் எத்தனை? (சமையலறை தவிர்த்து)

    அ)ஒன்று ஆ) இரண்டு இ) மூன்று ஈ) நான்கு
12. உங்கள் வீட்டில் தனி சமையலறை உள்ளதா?

    அ) ஆம் ஆ) இல்லை
13. எந்த வகையாக எரிபொருளை சமைப்பதற்கு உபயோகிக்கிறீர்கள்?

    அ) கேஸ் அடுப்பு ஆ) மண்ணெண்ணெய்.

    இ) மாட்டுச்சானம் / விறகு அடுப்பு / இலைகள் ஈ) அ + இ
14. நீங்கள் சமைப்பீர்களா?

    அ) ஆம் ஆ) இல்லை
15. ஆம் எனில்,

    அ) ஒரு நாளைக்கு எத்தகை மணி நேரம்

    ① <3 மணி நேரம் ② >3 மணி நேரம்

ஆ) மொத்தமாக எத்தனை வருடம்?

① <10 வருடங்கள் ② 10 – 15 வருடங்கள், ③ >15 வருடங்கள்

16. போதுமான காற்றோட்டம் உள்ள சமையலறை

அ)ஆம் ஆ)இல்லை

<u>புகைபிடித்தல் சம்பந்தமான கேள்விகள்</u>

17. நீங்கள் தற்போது புகைபிடிப்பவரா?

அல்லது

ஏற்கெனவே புகை பிடித்தவரா?

அல்லது

புகை பிடிக்காதவரா?

18. புகைபிடிப்பவர் அல்லது பிடித்தவராயின்

அ) எந்த வகையை உபயோகித்தீர்?

1) சிகரெட் 2) பீடி 3) இரண்டும் 4) வேறு ஏதாவது

ஆ) ஒரு நாளைக்கு எத்தனை (சிகரெட் / பீடி) பிடிப்பீர்கள் அல்லது பிடித்தீர்கள்?

இ) எத்தனை வருடமாக இப்பழக்கம்?

ஈ) எந்த வயதில் புகைபிடிக்க ஆரம்பித்தீர்கள்?

19. உங்கள் முன் யாரேனும் புகை பிடித்துள்ளனரா?

அ) ஆம் ஆ)இல்லை

20. ஆம் எனில், யாரிடமிருந்து....

எப்பொழுதிருந்து

21. தொழிற்சாலை ஏதும் உங்கள் வீட்டின் அருகில் உள்ளதா?

அ) ஆம் ஆ) இல்லை

22. நுரையீரல் காசநோய் வந்துள்ளதா?

அ) ஆம் ஆ) இல்லை

23. ஏற்கெனவே நுரையீரல் சம்பந்தமாக சிகிச்சை ஏதும் தற்போது பெறுகிறீர்களா?

அ) ஆம் இ) இல்லை

<u>நுரையீரல் சம்பந்தமான நோய் அறிகுறிகள் பற்றிய விவரம்.</u>

24. உங்களுக்கு நீண்ட காலமாக இருமல் உள்ளதா?

அ) ஆம் ஆ) இல்லை

கீழ்கண்ட மூன்று கேள்விகள் மூலம் மேற்கூறிய கேள்விக்குபதிலை கண்டறியும்

24 a. வருடத்தின் ஏதாவது ஒரு மாதத்தில் பெரும்பாலான நாட்களுக்கு இருமல் இருந்துள்ளதா?

ஆ) ஆம் ஆ) இல்லை

24 b. ஆம் எனில், இவ்வகை இருமல் வருடத்திற்கு மூன்று மாதங்கள் இருந்துள்ளதா?

அ) ஆம் ஆ) இல்லை

24 c. இவ்வகை இருமல் எத்தனை வருடங்களாக இருந்திருக்கிறது?

அ) <2 வருடங்கள் ஆ) <2-5 வருடங்கள் இ) >5 வருடங்கள்

25. இருமல் இருக்கும் பட்சத்தில், சீதோஷண நிலைக்கு ஏற்ப இருமலின் தன்மை மாறுபடுமா?

அ) ஆம் ஆ)இல்லை

26. உங்களுக்கு நீண்ட காலமாக கபம் உள்ளதா?

அ) ஆம் ஆ) இல்லை

கீழ்கண்ட மூன்று கேள்விகள் மூலம் மேற்கூறிய கேள்விக்குபதிலை கண்டறியும்

26 a. வருடத்தின் ஏதாவது ஒரு மாதத்தில் பெரும்பாலான நாட்களுக்கு கபம் இருந்துள்ளதா?

ஆ) ஆம் ஆ) இல்லை

26 b. ஆம் எனில், இவ்வகை கபம் வருடத்திற்கு மூன்று மாதங்கள் இருந்துள்ளதா?

அ) ஆம் ஆ) இல்லை

26 c. இவ்வகை கபம் எத்தனை வருடங்களாக இருந்திருக்கிறது?

அ) <2 வருடங்கள் ஆ) <2-5 வருடங்கள் இ) >5 வருடங்கள்

27. காலையில் முதல் வேலையாக, கபத்தை வெளியேற்றுவீர்களா?

அ) ஆம் ஆ) இல்லை

28. சளி இல்லாத சமயத்தில் கபம் வருமா?

அ) ஆம் ஆ) இல்லை

29. உங்களுக்கு மூச்சுதிணறல் உள்ளதா?

அ) ஆம் ஆ) இல்லை

29 a. ஆம் எனில்

நிலை 1 அ) ஆம் ஆ) இல்லை

நிலை 2 அ) ஆம் ஆ) இல்லை

நிலை 3 அ) ஆம் ஆ) இல்லை

நிலை 4 அ) ஆம் ஆ) இல்லை

29 b. தினமும் மூச்சுத்திணறல் உள்ளதா?

அ) ஆம் ஆ) இல்லை

29 c நாளுக்கு நாள் மூச்சுத் திணறல் அதிகரிக்கிறதா?

அ) ஆம் ஆ) இல்லை

29 d மூச்சுத் திணறல் காரணமாக நீங்கள் எப்பொழுதாவது மருத்துவமனையில் உள்நோயாளியாக சிகிச்சை பெற்றுள்ளீர்களா?

அ) ஆம் ஆ) இல்லை

ஆஸ்துமா நோயின் அறிகுறிகள் பற்றிய விவரம்

30. உங்களுக்கு ஒவ்வாமை உள்ளதா?

அ) ஆம் ஆ) இல்லை

31. கடந்த ஒரு வருடத்தில், இருமலினாலோ அல்லது மூச்சுத்திணறலினாலோ, நீங்கள் தூக்கத்தில் இருந்து விழித் திருக்கிறீர்கள்?

அ) ஆம் ஆ) இல்லை

32. **COPD மதிப்பெண்**

அ) < 17 ஆ) ≥ 17

பரிசோதனை

உயரம் :

எடை :

PEFR

கணிக்கப்பட்ட மதிப்பு	பார்த்த மதிப்பு	சதவிகீதம்	முடிவு

ANNEXURE IV

SOCIO ECONOMIC CLASS BASED ON MODIFIED B.G.PRASAD'S CLASSIFICATION

As the study was done in rural area, modified B.G. Prasad's classification was used for socio economic classification. The calculation was done as follows:

Consumer Price Index for rural labourers in Tamilnadu for the month of October 2012 =661

Multiplication factor = Value of consumer price index X 4.93/100

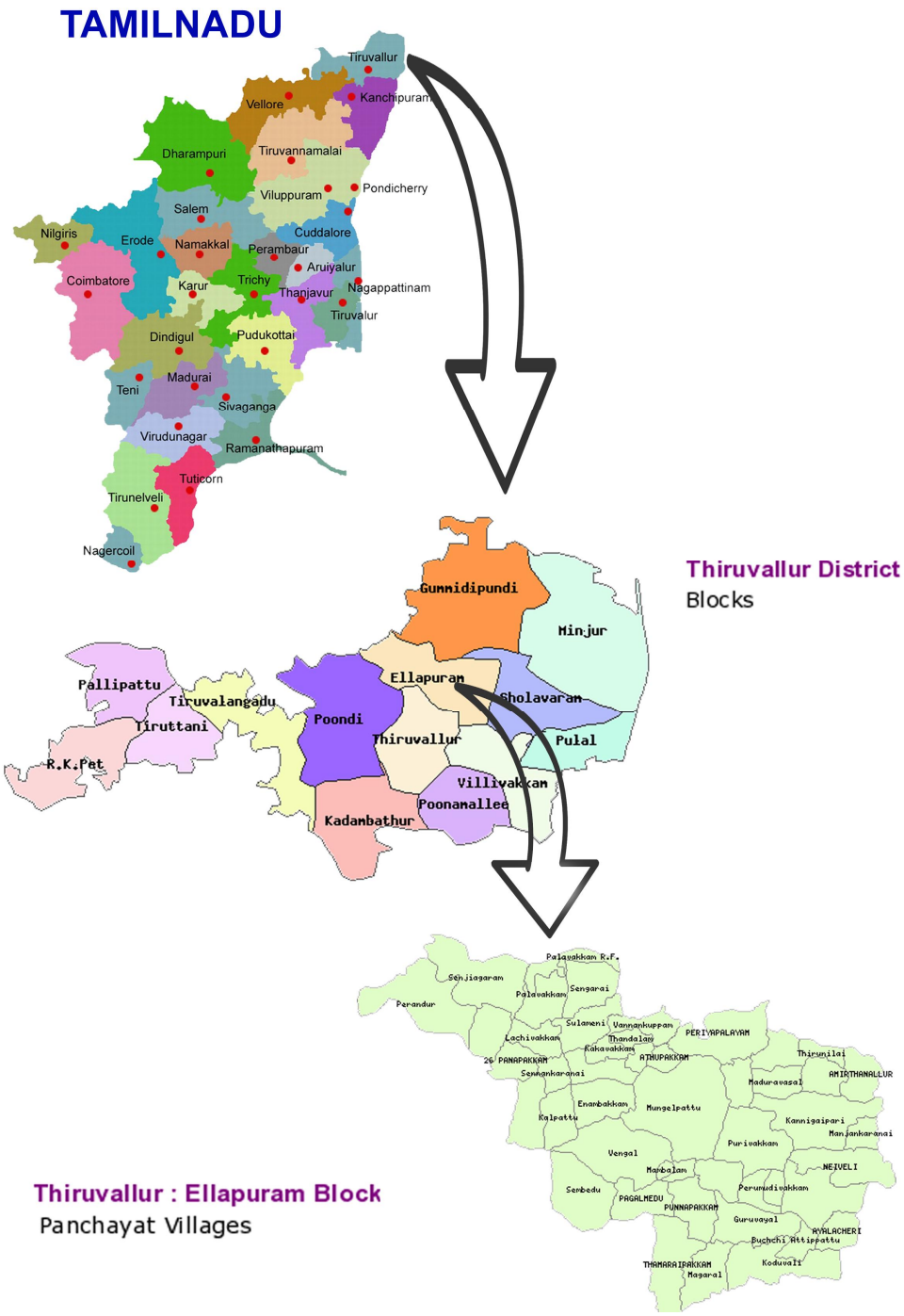
= 661 X 4.93/100

= 32.59

Modified BG Prasad's classification for october 2012 = Percapita income in 1961 X multiplication factor

CLASS	OLD CLASSIFICATION 1961	FOR OCTOBER 2012
I	100 & above	3259 & above
II	50-99	1630-3258
III	30-49	978-1629
IV	15-29	489-977
V	<15	<489

ANNEXURE – V


TAMILNADU
Tiruvallur
Kanchipuram
Vellore
Dharampuri
Tiruvannamalai
Viluppuram
Pondicherry
Salem
Nilgiris
Erode
Namakkal
Cuddalore
Perambaur
Coimbatore
Karur
Trichy
Aruiyalur
Thanjavur
Nagappattinam
Tiruvalur
Dindigul
Pudukottai
Madurai
Teni
Sivaganga
Virudunagar
Ramanathapuram
Tuticorn
Tirunelveli
Nagercoil
Thiruvallur District
Blocks
Gummidipundi
Minjur
Ellapuran
Sholavaram
Pallipattu
Tiruvalangadu
Poondi
Tiruttani
Thiruvallur
Pulal
R.K.Pet
Villivakkam
Poonamallee
Kadambathur
Thiruvallur : Ellapuram Block
Panchayat Villages

ANNEXURE – VI

LIST OF TOTAL VILLAGES IN ELLAPURAM BLOCK

S.No	Village Name	Total Population	Cumulative Population
1	Enambakkam	1433	1433
2	**Kalpattu**	**2030**	**3463**
3	Malandur	1651	5114
4	Mambalam	1508	6622
5	**Vadamadurai***	**6472**	**13094**
6	**Vengal**	**4942**	**18036**
7	Pagalmedu	1266	19302
8	Punapakkam	1575	20877
9	**Sembedu**	**2795**	**23672**
10	Athangikavanoor	1064	24736
11	**Kilambakkam**	**1285**	**26021**
12	Alinjivakkam	1443	27464
13	Athivakkam	1145	28609
14	Alappakkam	958	29567
45	Tiruneli	876	30443
16	**Akarapakkam**	**1450**	**31893**
17	Maduravaral	997	32890
18	Panapakkam82	1508	34398
19	**Periyapalayam***	**7120**	**41518**
20	**Kannigaipair***	**5134**	**46652**
21	Kummarapettai	3506	50158
22	**Panayancheri**	**1387**	**51539**
23	**Poochiathipattu**	**1974**	**53513**
24	Ayalancheri	2699	56212
25	**Guruvayal**	**2882**	**59094**
26	Soothupakkam	776	59870
27	Latchivakkam	2100	61970
28	**Palavakkam**	**3046**	**65016**
29	**Tharatchi**	**3340**	**68356**

30	Senjiagaram	1308	69664
31	Thamaraipakkam	891	70555
32	**Perandur**	**2498**	**73053**
33	Panapakkam43	2018	75071
34	Tholaivedu	1198	76269
35	**Kakkavakkam**	**1556**	**77825**
36	Thumbakkam	857	78682
37	Chennankaranai	1836	80518
38	Vannankuppam	1386	81904
39	**Athupakkam**	**2684**	**84588**
40	Thandalam	1451	86039
41	**Sulaimani**	**2173**	**88212**
42	Senkarai	1142	89654
43	Amirthanallur	972	90626
44	**Kannigapuram**	**1854**	**92480**
45	Koduveli	1973	94453
46	Kommangamedu	1890	96343
47	**Magaral**	**1935**	**98278**
48	Mangakaranai	2404	100682
49	**Neiveli**	**1557**	**102239**
50	Perumudivakkam	658	102897
51	Purivakkam	1783	104680
52	**Thamaraipakkam**	**5465**	**110145**
53	Thirukandalam	4544	114689

Villages marked in bold letters were the selected clusters for this study out of total clusters.

Those village marked with * = 2 clusters in that same village.

Totally 24 clusters selected for this study.

ANNEXURE VII

KEY TO MASTER CHART

Variable	Label	Coding
S.No.	Serial Number	1,2 etc
Age	Age of the participant	30,31,32etc
Sex	sex	1=Male 2=Female
Cluster_no.	Cluster number to which the participant belongs	1,2,3 etc
Religion	Religion	1= Hindu 2=Christian 3=Muslim 4= Others
Education	Education of the participant	1= Illiterate 2 = I - V Std 3=VI – XII Std 4 = Degree 5 = PG Degree 6=Others
Occupation	Occupation of the participant	1=Housewife 2=Coolie 3=Agricultural 4=Carpenter 5=Welding 6=Industrial Worker 7= Others
Income	Total income of the family	
Members	Total members of the family	
House_type	Type of house	1= Kutcha 2=Semipucca 3=Pucca 4=Others
Rooms	No.of rooms in the house	
kitchen	Separate kitchen in the house	1=Yes 2=No
Cook_fuel	Type of cooking fuel used	1=LPG 2=Kerosene 3=Solid Fuels (Cow Dung, Coal, Wood) 4=Both LPG & biomass
Selfcook	Self cooking at home	1=Yes 2=No
Cook_Dur	Total duration of cooking	1= < 10 yrs 2=10 - 15 years 3= > 15 yrs

Cook_Hrs	Cooking hours/ day	1= < 3 hrs 2 = > 3 hrs
Ventilation	Adequate ventilation in kitchen	1= Present 2=Absent
Smoke_H/o	Smoking history of the participant	1=Current Smoker 2=Ex-Smoker 3=Non Smoker
Smoke_What	Type of smoking product used	1=Cigaratte 2=Beedi 3=Both 4=Others
Age_Smoke	Starting age of smoking	
Smoke_no.	No.of cigarette/bidi smoked/day	
Smoke_Dur	Total duration of smoking	
P_smoke	Exposure to Passive smoking	1=Yes 2= No
Pass_whom	From whom exposed to passive smoking	
Pass_when	When exposed to passive smoking	1= adulthood 2= childhood 3= both
Industry	Presence of industry nearer to house	1=Yes 2= No
Resp_Tt	Respiratory treatment undergone already	1=Yes 2= No
Past_tb	Past history of pulmonary Tuberculosis	1=Yes 2= No
Chr_cough	History of chronic cough	1=Yes 2=No
weather	Weather affecting the cough	1=Yes 2= No
Chr_sputum	History of chronic sputum production	1=Yes 2= No
morning	Sputum production in the morning	1=Yes 2= No
No_cold	Sputum production in the absence of cold	1=Yes 2= No
Breath_diff	Breathing difficulty	1=Yes 2= No

Grading	Grading of breathlessness	1/2/3/4/5
Breath_daily	Presence of breathlessness daily	1=Yes 2= No
Breath_worse	Worsening of breathlessness over time	1=Yes 2= No
hospital	Hospitalised for breathlessness	1=Yes 2= No
wheeze	History of wheezing	1=Yes 2= No
Allergy	History of allergy	1=Yes 2= No
wakeup	Wake up at night due to cough or breathlessness	1=Yes 2= No
COPD score	COPD scoring for smokers	1= <17 2 = ≥17
Ht	Height in centimetres	
Wt	Weight in Kilograms	
Pred_value	Predicted value of PEFR	
Obs_value	Observed value of PEFR	
%pred	% of predicted value	
Inference	Inference	Normal /obstruction

ANNEXURE VIII - MASTER CHART

S. NO	AGE	SEX	Cluster _no.	reli- gion	Edu- cation	Occu- pation	Income	Mem- bers	House _type	Rooms	kit- chen	Cook_ fuel	Self cook	Cook_ Dur	Cook _Hrs	Venti- lation	Smoke_ H/o	smoke_ what	Age_ Smoke	Smoke _no.	Smoke_ Dur	P_ Smoke	pass_ whom	pass_ when	Indus- try	Resp_ Tt	Past_ tb	Chr_ cough	Weather	Chr_ sputum	morning	No_ cold	Breath_ diff	grading	Breath_ daily	Breath_ worse	hospital	wheeze	aller- gy	wake up	COPD Score	Ht	Wt	Pred_ value	Obs_ value	%Pred	Inference
1	35	F	1	1	1	2	15000	6	3	2	2	2	1	1	2	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0		0	0	0	1	2	0	147	57	350	310	88	Normal
2	38	F	1	1	1	2	2000	6	3	1	2	3	1	1	1	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	1	1	1	1	2	2	1	2	0	151	56	354	300	85	Normal
3	44	F	1	2	2	2	3000	3	2	1	1	1	1	1	1	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	1	1	1	2	2	2	1	2	0	146	63	322	310	96	Normal
4	60	F	1	1	1	2	3000	5	1	1	2	3	2	0	2	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	145	51	265	280	105	Normal
5	55	F	1	1	1	2	1500	4	3	3	1	4	1	3	1	1	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	156	60	321	390	121	Normal
6	65	F	1	3	2	7	3000	2	2	2	1	4	1	3	1	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	1	1	2	1	2	2	1	2	0	152	47	281	250	89	Normal
7	38	F	1	1	1	1	3000	4	2	4	1	4	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	1	1	1	1	2	1	2	2	1	2	2	2	2	0	151	65	354	330	93	Normal
8	45	F	1	1	2	2	2000	5	1	1	2	3	1	3	1	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	1	2	2	2	2	2	2	2	0	146	48	319	320	100	Normal
9	37	F	1	1	2	2	36000	4	3	2	2	3	1	1	2	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	1	2	2	1	2	2	1	2	0	153	55	363	300	83	Normal
10	47	M	1	1	2	2	3000	6	3	1	2	3	2	0	0	2	1	2	27	10	20	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	1	2	0	162	52	440	320	73	Obstruction
11	55	M	1	1	1	2	3000	7	3	1	2	3	2	0	0	2	1	2	25	24	30	2	0	0	2	1	2	1	1	1	1	1	1	4	1	1	2	1	1	1	8	157	36	404	310	77	Obstruction
12	43	M	1	1	3	7	19000	7	2	3	1	1	2	0	0	2	3	0	0	0	0	1	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	1	2	22	163	62.5	452	440	97	Normal
13	60	M	1	1	1	3	24000	3	1	1	2	3	2	0	0	2	2	2	15	24	43	2	0	0	2	2	2	1	2	1	2	1	1	3	1	2	1	1	2	2	8	156	48	389	180	46	Obstruction
14	48	M	1	1	3	2	36000	4	1	1	2	3	2	0	0	2	3	0	0	0	0	1	4	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	29	155	59	413	380	92	Normal
15	60	M	1	1	2	2	4000	3	3	1	2	3	2	0	0	2	2	3	10	15	50	2	0	0	2	2	2	2	0	0	0	0	1	2	1	1	1	1	2	2	0	163	59	413	240	58	Obstruction
16	30	M	1	1	3	2	4000	3	2	1	2	3	2	0	0	2	1	1	25	4	5	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	30	167	67	495	380	77	Obstruction
17	60	M	1	1	2	2	4000	6	2	2	2	3	2	0	0	2	1	2	15	12	45	2	0	0	2	2	2	1	2	1	2	1	2	0	0	0	0	0	1	1	11	156	47	390	260	67	Obstruction
18	35	F	1	1	1	3	2000	4	3	1	2	1	1	2	1	2	3	0	0	0	0	1	3	3	2	1	2	1	1	1	1	1	1	3	1	1	2	1	2	1	22	154	60	372	300	81	Normal
19	58	M	1	1	1	7	500	1	1	0	0	0	0	0	0	0	2	1	26	15	32	2	0	0	2	1	2	2	0	0	0	0	1	3	1	1	2	1	1	1	0	160	50	408	200	49	Obstruction
20	42	F	1	1	1	3	1800	2	2	1	2	1	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	21	143	50	318	360	113	Normal
21	40	F	2	1	1	3	1500	3	2	4	1	1	1	3	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	3	1	1	2	2	2	2	0	160	56	376	310	82	Normal
22	32	F	2	1	2	3	3000	4	1	1	2	1	1	2	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	154	55	380	430	126	Normal
23	50	F	2	1	2	3	5000	6	3	2	1	3	2	3	1	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	1	1	1	1	2	1	1	2	0	154	60	330	220	67	Obstruction
24	47	F	2	1	3	3	4000	4	3	2	2	3	1	3	1	1	3	0	0	0	0	1	3	1	2	2	2	2	0	0	0	0	1	1	1	2	2	1	1	2	0	154	56	338	330	98	Normal
25	55	F	2	1	1	3	12000	11	3	4	2	3	2	3	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	148	62	313	260	83	Normal
26	37	F	2	1	1	2	4000	5	3	2	1	3	1	3	1	1	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	1	2	0	138	45	317	275	87	Normal
27	57	M	2	1	3	3	5000	3	3	3	1	1	2	0	0	1	3	0	0	0	0	2	0	0	2	2	2	1	1	2	0	0	1	2	1	2	2	1	2	2	0	160	54	410	460	112	Normal
28	50	F	2	1	1	1	2000	4	3	2	1	2	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	1	1	1	2	2	2	2	0	147	60	308	260	84	Normal
29	53	M	2	1	4	7	80000	3	3	1	1	2	0	0	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	165	65	437	390	89	Normal
30	45	F	2	2	1	2	4000	5	3	1	2	3	2	0	0	2	3	0	0	0	0	1	1	1	2	2	2	1	2	1	2	2	1	3	1	1	2	1	1	2	0	148	55	325	310	95	Normal
31	50	F	2	1	1	3	7000	8	3	4	1	4	1	2	1	2	3	0	0	0	0	1	4	2	2	2	2	2	0	0	0	0	1	3	1	2	2	1	1	1	0	153	60	327	140	43	Obstruction
32	39	M	2	1	3	3	3000	3	3	4	1	4	2	0	0	1	3	0	0	0	0	1	3	3	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	170	50	486	460	95	Normal
33	30	F	2	1	2	6	3500	2	1	1	2	3	1	2	1	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	139	62	340	300	88	Normal
34	36	F	2	1	3	1	3000	4	1	1	2	3	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	154	55	369	400	108	Normal
35	42	F	2	1	1	2	4000	7	3	2	2	3	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	154	55	352	300	85	Normal
36	55	F	2	1	3	3	3000	4	3	2	2	1	1	3	1	2	3	0	0	0	0	1	0	0	2	2	2	2	0	0	0	0	1	1	1	1	2	2	2	2	0	151	60	306	250	82	Normal
37	32	F	2	1	3	3	2000	4	1	1	1	4	1	2	1	2	3	0	0	0	0	1	3	2	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	140	58	337	320	95	Normal
38	60	F	2	1	1	1	3000	5	1	1	2	3	1	3	2	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	3	1	1	2	1	2	2	0	156	54	308	165	54	Obstruction
39	30	F	2	1	2	1	2000	2	3	2	1	3	1	2	2	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	3	1	1	2	1	1	2	0	148	52	367	350	95	Normal
40	31	F	2	1	3	7	7000	4	2	2	2	1	1	2	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	155	58	386	400	103	Normal
41	52	F	3	3	1	1	5000	4	3	3	1	1	1	3	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	1	2	2	2	2	2	2	0	148	55	305	330	108	Normal
42	47	F	3	1	1	3	2000	2	1	1	2	1	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	3	1	1	2	2	1	2	0	160	62	356	290	81	Normal
43	35	F	3	1	1	3	2000	5	3	3	1	1	1	3	1	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	146	66	347	330	95	Normal
44	30	F	3	1	1	3	2000	4	3	1	2	4	1	2	1	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	155	58	389	350	90	Normal
45	60	F	3	1	1	1	1000	5	1	1	2	3	1	3	2	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	1	1	1	2	1	1	2	0	144	60	271	220	81	Normal
46	31	F	3	1	3	3	3000	4	3	1	2	3	1	2	2	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	1	1	1	2	2	2	2	2	0	160	55	401	340	85	Normal
47	48	F	3	1	2	3	1000	2	3	1	2	1	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	148	55	317	320	101	Normal
48	60	F	3	1	1	3	2000	2	2	2	1	1	1	3	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	3	1	1	2	2	2	2	0	148	42	283	235	83	Normal
49	50	F	3	1	2	2	2000	3	2	1	1	1	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	155	55	409	340	83	Normal
50	60	F	3	1	1	3	2000	2	3	2	1	1	1	3	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	3	1	1	2	2	2	2	0	148	50	283	250	88	Normal
51	40	F	3	1	1	2	2000	1	2	2	2	1	1	3	1	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	1	2	0	148	54	339	280	82	Normal
52	65	M	3	1	1	3	2000	4	2	3	1	1	2	0	0	1	2	2	15	50	50	2	0	0	2	2	2	1	1	1	1	2	1	3	1	1	2	1	2	1	0	155	52	375	130	35	Obstruction
53	38	F	3	1	1	3	3000	3	2	2	2	2	1	3	2	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	27	142	50	348	290	83	Normal
54	33	M	3	1	3	7	7000	6	3	3	2	1	2	0	0	2	1	1	20	5	13	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	1	2	0	164	52	478	520	108	Normal
55	65	M	3	1	1	2	1280	4	3	2	2	3	2	0	0	2	2	2	30	4	35	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	8	163	65	402	300	75	Obstruction
56	62	M	3	1	1	3	3000	3	2	1	2	3	2	0	0	2	1	2	20	18	42	2	0	0	2	1	2	2	0	0	0	0	1	1	1	2	2	2	2	2	15	163	58	409	210	51	Obstruction
57	60	m	3	1	1	3	2000	2	2	3	2	1	2	0	0	2	2	2	15	15	40	2	0	0	2	2	2	1	2	1	1	1	1	2	1	2	2	2	2	2	22	162	50	409	170	42	Obstruction
58	32	M	3	1	2	2	2000	4	1	1	2	2	2	0	0	2	1	3	25	6	7	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	1	2	22	159	56	464	430	93	Normal
59	35	M	3	1	2	7	2000	4	1	1	2	3	2	0	0	2	3	0	0	0	0	1	4	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	8	159	55	457	510	111	Normal
60	30	M	3	1	1	3	4000	4	2	1	2	2	2	0	0	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	1	2	2	2	2	2	1	0	148	58	431	420	97	Normal
61	65	M	4	1	1	2	2000	5	2	1	2	3	2	0	0	2	1	2	30	25	20	2	0	0	2	2	2	2	0	0	0	0	1	1	2	2	2	2	2	2	0	161	60	395	230	58	Obstruction
62	60	M	4	1	1	3	3000	4	3	3	2	4	2	0	0	2	2	2	15	5	45	2	0	0	2	1	1	1	1	1	1	1	1	3	1	1	2	1	1	2	22	158	50	396	180	45	Obstruction
63	70	M	4	1	1	3	6000	7	3	2	2	4	2	0	0	2	1	2	15	10	55	2	0	0	2	2	2	1	1	1	1	1	1	1	1	1	2	1	2	1	23	165	62	398	250	63	Obstruction
64	52	M	4	1	2	3	6000	5	3	2	1	4	2	0	0	1	2	2	22	24	30	2	0	0	2	2	2	2	0	0	0	0	1	2	2	2	2	2	2	2	31	164	60	435	340	78	Obstruction
65	60	M	4	1	2	2	2500	3	3	2	1	1	2	0	0	2	3	0	0	0	0	2	0	0	2	2	2	1	1	1	1	2	1	3	1	2	2	1	1	1	18	160	62	403	250	62	Obstruction
66	50	F	4	1	1	3	1000	2	2	1	2	1	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	2	1	1	2	1	1	1	0	153	52	327	170	52	Obstruction
67	45	F	4	1	3	3	2000	3	2	2	1	2	1	2	2	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	154	56	344	290	84	Normal
68	60	M	4	1	1	2	2000	5	3	2	2	1	2	0	0	2	2	2	15	4	45	2	0	0	2	2	1	1	2	1	1	1	1	3	1	2	2	1	2	2	0	160	52	403	100	25	Obstruction
69	35	F	4	1	2	7	750	2	1	1	2	3	1	2	2	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	1	2	23	112	29	244	200	82	Normal
70	38	F	4	1	1	3	2000	4	2	2	2	1	1	2	1	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	148	51	345	280	81	Normal

71	30	M	4	1	3	2	5000	5	2	2	2	4	2	0	0	2	3	0	0	0	0	1	4	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	167	64	495	410	83	Normal
72	45	M	4	1	2	3	2000	4	3	2	2	3	2	0	0	2	3	0	0	0	0	1	4	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	161	60	441	450	102	Normal
73	42	M	4	1	1	2	300	3	3	2	2	3	2	0	0	2	3	0	0	0	0	1	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	157	51	435	250	57	Obstruction
74	60	M	4	1	1	2	750	2	3	2	2	4	2	0	0	2	3	0	0	0	0	2	0	0	2	1	2	2	0	0	0	0	2	0	0	0	0	0	2	2	11	171	55	440	300	68	Obstruction
75	40	M	4	1	1	1	1000	4	3	2	2	3	1	3	2	2	3	0	0	0	0	2	0	0	2	2	1	1	1	1	1	2	1	3	1	1	2	1	1	1	0	154	60	358	250	70	Obstruction
76	60	M	4	1	2	3	2000	6	3	2	2	4	2	0	0	2	2	3	20	4	40	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	166	62	423	440	104	Normal
77	50	F	4	1	2	3	750	2	3	2	2	3	1	3	2	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	1	2	1	2	2	2	2	2	19	146	58	305	310	101	Normal
78	65	M	4	1	2	3	1500	2	3	4	2	2	2	0	0	2	2	2	15	7	50	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	161	54	395	480	121	Normal
79	50	F	4	1	1	2	750	2	2	1	2	3	1	3	2	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	1	2	1	2	2	2	2	2	21	148	53	311	350	112	Normal
80	50	F	4	1	1	3	750	1	1	1	2	3	1	3	2	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	139	36	284	230	81	Normal
81	60	M	5	1	3	3	1000	3	2	4	2	3	2	0	0	2	2	2	20	4	40	2	0	0	2	2	2	1	2	1	1	2	1	3	1	2	2	1	1	2	0	157	61	393	290	74	Obstruction
82	75	M	5	1	2	3	1000	2	3	2	2	1	2	0	0	2	2	2	15	10	60	2	0	0	2	2	1	1	2	1	1	1	1	2	1	2	2	1	1	2	17	168	58	396	250	63	Obstruction
83	47	F	5	1	2	1	12000	4	2	2	1	1	1	3	1	2	3	0	0	0	0	2	0	0	2	1	1	2	0	0	0	0	1	3	1	1	2	1	1	2	23	140	75	295	170	58	Obstruction
84	35	F	5	1	2	1	3000	4	3	1	2	4	1	2	1	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	141	59	332	270	81	Normal
85	50	F	5	1	3	3	4000	8	3	4	1	4	2	0	0	1	3	0	0	0	0	1	3	3	2	2	2	2	0	0	0	0	2	0	0	0	0	0	1	2	0	155	65	409	350	85	Normal
86	43	M	5	1	3	2	5000	3	3	3	1	1	2	0	0	1	1	3	23	12	23	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	153	80	418	320	76	Obstruction
87	40	F	5	1	2	1	3000	5	2	2	2	1	1	1	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	9	144	70	327	300	92	Normal
88	32	F	5	1	4	7	3000	4	3	1	2	1	1	1	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	150	47	367	370	101	Normal
89	30	F	5	1	2	1	2000	4	2	1	2	1	1	1	1	2	3	0	0	0	0	2	0	0	2	2	1	2	0	0	0	0	1	1	1	1	2	1	1	1	0	139	70	340	280	82	Normal
90	40	F	5	1	1	1	2000	4	3	2	1	4	1	2	1	1	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	150	58	345	345	100	Normal
91	30	M	5	1	3	3	3000	4	3	2	1	1	2	0	0	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	153	80	448	520	116	Normal
92	35	F	5	1	2	1	3000	4	3	2	1	1	1	1	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	154	68	372	370	99	Normal
93	57	F	5	1	2	1	2000	4	2	1	2	4	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	139	61	264	350	132	Normal
94	32	F	5	1	3	1	2000	4	2	1	2	1	1	1	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	140	52	337	300	89	Normal
95	50	F	5	1	1	1	10000	6	3	4	1	4	1	3	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	2	1	2	2	2	2	2	0	145	70	302	320	106	Normal
96	33	F	5	1	3	1	2000	4	2	2	2	1	1	1	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	140	58	335	290	86	Normal
97	33	F	5	1	2	1	3000	3	2	1	2	1	1	1	1	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	143	55	344	300	87	Normal
98	43	F	5	1	2	1	10000	3	3	4	1	1	1	2	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	2	1	2	2	2	2	2	0	140	68	307	360	117	Normal
99	35	F	5	1	1	1	4000	6	2	2	2	4	1	2	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	1	2	2	2	2	2	2	0	138	70	323	360	111	Normal
100	45	F	5	1	4	1	3000	6	3	2	1	1	1	3	1	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	149	68	328	330	100	Normal
101	48	F	6	1	2	1	3000	2	3	2	1	4	1	2	1	2	3	0	0	0	0	1	1	1	2	2	1	2	0	0	0	0	1	2	1	2	2	2	1	1	0	141	70	296	310	104	Normal
102	38	F	6	1	2	2	2000	1	3	2	1	1	1	1	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	145	65	336	400	119	Normal
103	38	M	6	1	3	7	3000	4	3	2	1	1	2	0	0	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	161	82	457	400	87	Normal
104	45	F	6	2	3	1	5000	5	3	3	1	1	1	3	1	1	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	138	65	295	280	95	Normal
105	43	M	6	1	2	2	5000	6	2	2	2	3	2	0	0	2	3	0	0	0	0	1	4	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	151	49	411	480	116	Normal
106	32	M	6	2	3	2	3000	4	3	1	2	1	2	0	0	2	3	0	0	0	0	1	4	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	1	2	0	155	47	451	400	89	Normal
107	42	F	6	1	1	1	4000	4	2	1	2	3	1	2	2	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	1	2	0	151	70	342	290	85	Normal
108	42	M	6	2	1	3	3500	6	2	2	2	3	2	0	0	2	1	2	20	25	21	2	0	0	2	2	2	1	1	1	2	2	1	2	1	1	2	1	2	1	0	155	63	428	340	79	Obstruction
109	49	M	6	1	3	3	3000	3	3	3	1	1	2	0	0	1	2	1	20	9	19	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	21	145	72	378	400	105	Normal
110	51	M	6	1	2	3	2000	2	2	3	1	3	2	0	0	2	1	3	25	10	25	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	1	3	160	55	424	320	76	Obstruction
111	50	M	6	1	2	3	3000	3	1	1	2	1	2	0	0	2	1	3	20	7	30	2	0	0	2	2	2	2	0	0	0	0	1	1	2	2	2	2	2	2	15	151	70	395	300	76	Obstruction
112	52	M	6	1	3	3	6000	4	2	1	2	1	2	0	0	2	1	1	30	10	20	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	1	2	10	165	70	439	320	73	Obstruction
113	44	M	6	2	3	7	3000	5	2	2	2	1	2	0	0	2	3	0	0	0	0	1	4	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	8	153	75	416	400	96	Normal
114	40	F	6	1	1	1	3000	1	1	1	2	4	1	2	2	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	130	52	284	250	88	Normal
115	54	M	6	1	4	7	10000	6	3	4	1	1	2	0	0	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	155	68	400	480	120	Normal
116	43	F	6	1	3	1	12000	6	3	3	1	1	1	2	1	1	3	0	0	0	0	1	2	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	140	69	307	310	101	Normal
117	40	F	6	1	2	2	2000	5	2	1	1	1	1	3	1	1	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	150	57	345	330	96	Normal
118	30	F	6	1	4	1	7000	4	2	2	1	1	1	2	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	158	49	398	330	83	Normal
119	60	F	6	1	1	2	840	1	2	1	2	3	1	3	2	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	163	46	329	400	121	Normal
120	42	F	6	1	3	1	5000	5	2	2	2	1	1	3	1	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	1	2	1	1	2	1	1	1	0	145	62	324	240	74	Obstruction
121	55	F	7	1	1	3	840	1	1	1	2	3	1	3	2	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	1	3	1	1	2	1	1	1	0	151	52	306	210	69	Obstruction
122	55	F	7	1	1	1	8000	5	3	1	1	1	1	3	1	1	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	160	69	334	310	93	Normal
123	35	M	7	1	2	3	2000	4	1	1	2	1	2	0	0	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	152	59	434	450	104	Normal
124	30	M	7	1	3	2	5000	3	2	1	2	4	2	0	0	2	2	1	23	4	7	1	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	164	52	485	530	109	Normal
125	31	M	7	1	2	3	4000	3	3	3	1	2	2	0	0	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	11	166	68	490	460	94	Normal
126	30	M	7	1	2	4	8000	3	3	1	2	1	2	0	0	2	1	1	25	4	5	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	164	67	485	540	111	Normal
127	30	M	7	1	4	7	7000	3	2	2	2	3	2	0	0	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	7	170	82	506	600	118	Normal
128	48	M	7	1	1	7	2000	3	2	2	2	3	2	0	0	2	2	1	15	2	33	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	165	56	448	320	71	Obstruction
129	30	F	7	1	3	2	2000	4	2	1	2	1	1	2	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	14	144	54	355	420	118	Normal
130	37	F	7	1	1	3	4200	4	3	2	2	3	1	2	2	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	2	2	2	2	2	2	2	0	156	70	372	350	94	Normal
131	35	F	7	1	1	2	1500	3	3	2	2	3	1	2	2	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	2	2	2	2	2	2	2	0	150	54	359	320	89	Normal
132	35	F	7	1	2	1	6000	3	2	2	2	1	1	2	1	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	1	2	0	153	46	369	310	84	Normal
133	45	F	7	1	1	2	2000	2	2	1	2	3	1	3	2	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	154	54	344	360	105	Normal
134	60	F	7	1	1	1	2000	4	3	2	2	3	1	3	2	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	151	59	292	250	86	Normal
135	45	M	7	1	1	2	2000	5	2	1	2	3	2	0	0	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	150	44	404	440	109	Normal
136	40	F	7	1	1	3	2500	4	3	2	2	3	1	3	2	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	157	64	367	325	88	Normal
137	38	M	7	1	3	7	6000	5	3	2	2	2	2	0	0	2	3	0	0	0	0	1	4	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	153	58	430	490	114	Normal
138	49	M	7	1	3	7	4500	3	3	2	2	1	2	0	0	2	3	0	0	0	0	1	4	1	2	2	2	2	0	0	0	0	1	1	2	2	2	2	2	2	0	151	53	398	440	110	Normal
139	37	F	7	1	1	3	3000	3	2	2	2	3	1	2	2	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	148	61	347	300	86	Normal
140	35	M	7	1	3	7	5000	4	3	2	2	1	2	0	0	2	1	1	30	2	5	2	0	0	2	2	2	2	0	0	0	0	1	1	2	2	2	2	2	2	0	162	91	467	460	98	Normal
141	34	M	8	1	4	7	30000	3	3	3	1	1	2	0	0	2	1	1	30	5	5	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	6	154	64	442	490	111	Normal
142	35	M	8	1	3	7	6000	4	3	1	1	1	2	0	0	2	2	1	27	5	7	1	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	7	167	68	484	430	89	Normal
143	38	M	8	1	3	7	5000	4	2	1	2	3	2	0	0	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	11	167	75	477	410	86	Normal
144	55	M	8	1	2	3	5000	8	3	2	2	1	2	0	0	2	2	2	30	10	15	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	155	47	398	300	75	Obstruction
145	44	M	8	1	3	3	3500	4	2	1	1	1	2	0	0	2	1	1	20	3	24	2	0	0	2	2	2	1	2	1	2	2	2	0	0	0	0	0	2	2	15	160	60	440	460	104	Normal
146	45	M	8	1	3	7	25000	3	3	1	1	4	2	0	0	1	1	1	15	4	30	2	0	0	2	2	2	1	1	1	1	2	1	2	1	1	1	1	1	2	11	169	75	468	310	66	Obstruction
147	45	M	8	1	2	3	5000	4	3	2	2	1	2	0	0	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	1	2	1	2	2	2	2	8	160	66	438	310	71	Obstruction
148	39	M	8	1	3	3	5000	4	3	2	1	3	2	0	0	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	3	1	2	2	1	2	1	0	168	81	469	410	87	Normal

149	40	M	8	1	3	7	7000	3	3	2	1	1	2	0	0	2	3	0	0	0	0	1	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	1	0	170	70	483	480	99	Normal
150	55	F	8	1	2	3	5000	8	3	2	2	1	1	3	1	2	3	0	0	0	0	2	0	0	2	1	2	1	1	1	1	2	1	2	1	2	2	1	2	1	0	150	52	303	310	102	Normal
151	60	M	8	1	1	2	2000	4	2	1	2	1	2	0	0	2	2	2	15	22	25	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	155	45	386	300	78	Obstruction
152	42	F	8	1	4	7	25000	3	3	1	1	4	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	1	2	1	1	2	2	0	0	0	0	0	2	2	22	142	63	315	260	82	Normal
153	58	M	8	1	3	3	12000	11	3	4	1	1	2	0	0	1	2	3	15	22	23	2	0	0	2	2	2	1	1	1	2	2	1	1	1	2	2	2	1	2	0	163	78	418	320	76	Obstruction
154	57	M	8	1	4	3	5000	3	3	2	1	1	2	0	0	1	2	1	20	4	3	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	13	165	75	427	480	112	Normal
155	47	F	8	1	2	1	8000	8	3	2	2	1	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	1	2	2	2	2	2	2	11	163	78	365	310	85	Normal
156	35	F	8	1	2	3	3000	3	3	2	1	1	1	2	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	1	2	2	2	2	2	2	0	159	68	387	330	85	Normal
157	37	M	8	1	4	3	5000	5	3	3	1	1	2	0	0	1	3	0	0	0	0	1	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	174	73	503	520	103	Normal
158	32	M	8	1	3	7	6000	3	3	2	2	3	2	0	0	2	1	1	20	5	12	2	0	0	2	2	2	2	0	0	0	0	1	2	1	2	2	2	2	2	0	168	86	495	410	83	Normal
159	45	M	8	1	1	3	3000	2	3	1	2	3	2	0	0	2	1	2	30	1	15	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	1	7	172	45	478	370	77	Obstruction
160	42	F	8	1	5	7	25000	4	3	2	1	1	1	2	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	11	145	60	324	310	96	Normal
161	39	M	9	1	5	7	25000	3	3	2	1	1	2	0	0	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	165	85	469	530	113	Normal
162	35	F	9	1	3	2	5000	4	3	2	1	1	1	2	1	2	3	9	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	2	2	2	2	2	2	2	0	150	65	359	310	86	Normal
163	60	F	9	1	1	1	1500	2	3	2	2	3	1	3	2	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	1	2	2	2	2	2	2	0	145	52	274	250	91	Normal
164	37	F	9	1	2	3	4500	4	3	2	1	1	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	1	1	1	2	2	1	1	1	2	2	2	2	2	0	154	68	366	310	85	Normal
165	33	M	9	1	3	7	7000	4	2	2	2	1	2	0	0	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	170	56	499	490	98	Normal
166	55	F	9	1	2	3	5000	10	3	4	1	1	1	3	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	148	59	297	250	84	Normal
167	54	F	9	1	2	1	1000	2	2	1	2	3	1	3	2	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	149	61	303	285	94	Normal
168	37	M	9	1	2	3	2000	4	3	2	1	1	2	0	0	2	2	1	35	5	1	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	154	47	435	390	90	Normal
169	39	F	9	1	3	1	5000	4	3	3	2	1	1	3	1	2	3	0	0	0	0	1	3	2	2	2	2	1	1	1	2	2	1	1	2	2	2	2	1	1	11	154	54	361	360	100	Normal
170	57	F	9	1	3	1	10000	3	3	3	1	1	1	3	1	1	3	0	0	0	0	1	4	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	1	2	0	167	55	349	400	115	Normal
171	45	F	9	1	1	2	6000	5	3	1	2	1	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	1	2	0	149	52	328	300	91	Normal
172	40	F	9	1	1	2	2000	2	2	1	2	3	1	3	1	2	3	0	0	0	0	1	1	3	2	2	2	2	0	0	0	0	2	0	0	0	0	0	1	2	0	146	50	333	330	99	Normal
173	48	F	9	1	3	1	8000	4	3	4	1	1	1	3	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	1	1	0	157	61	345	380	110	Normal
174	50	F	9	1	1	2	1500	4	3	3	1	4	1	3	1	1	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	160	52	348	330	95	Normal
175	49	F	9	3	2	7	3000	2	2	2	1	4	1	3	1	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	1	1	2	1	2	2	1	2	0	156	60	339	330	97	Normal
176	42	F	9	1	1	1	3000	4	2	4	1	4	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	1	1	1	1	2	1	2	1	2	2	2	2	2	0	153	55	349	270	77	obstruction
177	43	F	9	1	2	2	2000	5	1	1	2	3	1	3	1	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	1	2	2	2	2	2	2	2	0	154	58	350	270	77	Obstruction
178	55	F	9	1	3	3	4000	5	3	4	1	1	1	3	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	151	52	306	270	88	Normal
179	40	F	9	1	1	2	2000	2	1	1	2	3	1	3	1	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	143	45	324	300	92	Normal
180	41	F	9	1	1	1	4000	4	3	2	1	4	1	3	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	148	56	336	300	89	Normal
181	57	F	10	1	1	1	2000	2	3	3	1	1	1	3	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	149	52	294	300	102	Normal
182	45	F	10	1	2	2	3000	2	1	1	2	2	1	3	1	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	149	57	328	270	82	Normal
183	31	F	10	1	2	1	10000	7	3	1	2	3	1	2	2	2	3	0	0	0	0	1	1	3	2	2	2	2	0	0	0	0	1	1	2	2	2	2	2	2	0	145	35	355	300	84	Normal
184	33	F	10	1	3	1	3000	4	2	2	1	1	1	2	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	1	2	2	2	2	2	2	0	149	55	362	300	83	Normal
185	45	F	10	1	1	2	3000	2	2	1	1	3	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	146	51	319	350	110	Normal
186	40	F	10	1	1	1	7000	3	3	1	1	2	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	156	60	364	360	99	Normal
187	60	F	10	1	1	2	1500	1	2	1	2	1	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	148	50	283	230	81	Normal
188	45	F	10	1	1	2	1500	3	1	1	2	3	1	3	2	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	1	2	2	2	2	2	2	0	152	50	338	300	89	Normal
189	55	F	10	1	3	1	5000	6	3	3	1	1	1	3	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	152	60	310	360	116	Normal
190	45	F	10	1	1	2	2000	2	1	1	2	1	1	3	1	2	3	0	0	0	0	1	1	3	2	2	2	2	0	0	0	0	1	1	2	2	2	2	2	2	0	154	62	344	340	99	Normal
191	39	F	10	1	2	2	5000	4	2	2	1	1	1	3	1	1	3	0	0	0	0	1	3	3	2	2	2	2	0	0	0	0	1	1	2	2	2	2	2	2	0	164	56	391	330	84	Normal
192	55	F	10	1	2	1	1000	1	2	1	2	1	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	167	54	355	380	107	Normal
193	40	M	10	1	3	7	20000	2	3	3	1	1	2	0	0	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	168	65	476	570	120	Normal
194	46	F	10	1	1	2	6000	8	1	2	2	4	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	2	2	2	2	2	2	2	0	153	60	338	290	86	Normal
195	30	F	10	3	3	2	4000	4	2	2	1	1	1	3	1	2	3	0	0	0	0	1	1	3	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	154	55	386	340	88	Normal
196	42	F	10	1	2	3	3000	2	2	1	2	4	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	149	54	336	300	89	Normal
197	50	F	10	1	3	1	5000	7	3	2	1	1	1	3	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	155	60	333	310	93	Normal
198	60	F	10	1	1	2	3000	5	3	3	1	1	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	1	1	2	2	2	2	2	0	155	50	305	250	82	Normal
199	60	F	10	1	1	1	5000	4	2	2	1	1	1	3	1	1	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	160	55	320	270	84	Normal
200	60	F	10	1	1	1	1000	1	2	2	1	3	1	3	2	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	165	63	335	300	89	Normal
201	58	F	11	1	3	1	20000	8	3	4	1	1	1	3	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	161	68	329	300	91	Normal
202	47	F	11	1	1	2	3500	4	3	3	1	1	1	3	2	2	3	0	0	0	0	1	0	0	2	2	2	1	1	1	2	2	1	1	2	2	2	2	2	2	0	164	60	368	320	87	Normal
203	50	F	11	1	1	2	1500	1	3	3	1	3	1	3	2	2	3	0	0	0	0	2	0	0	2	2	2	1	1	2	0	0	1	2	2	2	2	2	1	2	0	156	50	336	200	59	Obstruction
204	60	F	11	1	1	2	2000	3	1	1	2	3	1	3	2	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	2	2	2	2	2	2	2	0	146	50	277	250	90	Normal
205	36	F	11	1	2	1	4000	2	1	1	2	1	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	153	55	366	310	85	Normal
206	42	F	11	1	1	1	4000	3	3	3	1	1	1	3	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	2	2	2	2	1	2	2	0	154	62	352	290	82	Normal
207	50	F	11	1	1	2	2000	3	3	2	2	1	1	3	1	2	3	0	0	0	0	1	4	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	155	60	333	320	96	Normal
208	53	M	11	1	1	7	15000	2	3	3	1	1	2	0	0	2	3	0	0	0	0	1	4	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	1	2	0	172	63	460	400	87	Normal
209	57	M	11	1	3	7	10000	6	3	2	1	3	2	0	0	2	1	2	18	10	40	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	1	2	0	157	60	400	310	77	obstruction
210	41	M	11	1	4	7	15000	3	3	2	1	1	2	0	0	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	14	165	75	464	650	140	Normal
211	35	M	11	1	2	3	4000	4	2	1	2	3	2	0	0	2	1	1	25	5	10	2	0	0	2	2	2	2	0	0	0	0	1	1	1	1	2	2	2	2	0	168	65	414	400	97	Normal
212	38	M	11	1	3	3	2000	4	3	2	1	1	2	0	0	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	11	165	100	471	530	112	Normal
213	32	M	11	1	3	7	5000	4	3	2	1	1	2	0	0	2	1	4	20	3	12	2	0	0	2	2	2	2	0	0	0	0	1	1	1	1	2	2	2	2	0	160	62	468	500	107	Normal
214	60	M	11	1	2	3	2000	3	2	1	2	3	2	0	0	2	1	2	20	25	40	2	0	0	2	2	2	1	1	1	1	1	1	1	1	1	2	2	2	2	11	162	45	409	300	73	Obstruction
215	32	M	11	1	3	7	4000	4	3	2	2	3	2	0	0	2	1	3	17	5	15	2	0	0	2	2	2	2	0	0	0	0	1	3	1	2	2	2	2	2	29	169	90	498	450	90	Normal
216	30	M	11	1	3	3	2000	2	2	2	2	3	2	0	0	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	6	142	35	428	400	93	Normal
217	41	M	11	1	3	3	2000	5	3	2	1	1	2	0	0	1	1	2	20	8	21	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	166	61	467	420	90	Normal
218	42	M	11	1	3	7	2000	5	2	4	1	1	2	0	0	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	11	176	62	499	550	110	Normal
219	55	F	11	1	2	3	4000	7	3	3	1	1	1	3	1	1	3	0	0	0	0	1	4	1	2	2	2	2	0	0	0	0	1	1	1	2	2	2	2	2	0	152	53	310	300	97	Normal
220	39	F	11	1	2	2	2000	5	1	1	1	2	1	3	2	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	1	2	1	2	2	2	1	2	0	149	44	345	340	98	Normal
221	45	F	12	1	2	3	4000	3	3	3	1	1	1	3	1	1	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	165	70	377	330	87	Normal
222	58	F	12	1	1	2	1500	1	2	1	2	3	1	3	2	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	148	50	289	250	86	Normal
223	50	F	12	1	1	1	1000	5	2	2	1	1	1	3	1	1	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	149	48	314	265	84	Normal
224	43	F	12	1	1	1	800	3	2	2	2	1	1	3	1	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	1	3	1	1	2	2	2	2	0	145	73	322	340	105	Normal
225	60	F	12	2	3	1	4000	4	2	2	1	1	1	3	1	1	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	1	1	1	2	2	2	2	2	0	144	61	271	270	100	Normal
226	31	F	12	1	3	1	2000	4	2	2	1	1	1	2	1	1	3	0	0	0	0	1	2	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	148	55	364	320	88	Normal

227	36	F	12	1	3	1	3000	4	2	2	1	1	1	2	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	153	52	366	350	96	Normal
228	45	F	12	3	1	1	2500	3	2	3	1	1	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	3	1	2	2	2	2	1	0	141	46	304	200	66	obstruction
229	54	M	12	2	3	2	3000	6	2	1	2	3	2	0	0	2	1	2	30	5	24	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	158	50	410	400	97	Normal
230	37	M	12	1	2	2	1000	2	2	2	2	1	2	0	0	2	2	2	20	22	16	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	15	158	54	449	320	71	Obstruction
231	45	F	12	1	1	1	4000	4	2	4	1	3	1	3	2	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	13	140	44	301	290	96	Normal
232	43	M	12	1	3	2	1000	1	2	2	2	3	2	0	0	2	2	1	20	1	13	2	0	0	2	2	2	2	0	0	0	0	1	3	1	2	2	2	2	2	0	151	53	411	310	75	Obstruction
233	30	F	12	1	3	1	2000	4	1	1	2	3	1	2	2	2	3	0	0	0	0	1	1	1	2	2	2	1	2	2	2	2	1	3	1	1	2	2	1	2	11	148	37	367	320	87	Normal
234	60	M	12	1	1	3	2000	4	1	1	2	3	2	0	0	2	2	2	30	22	27	2	0	0	2	2	2	1	1	1	1	1	1	3	1	1	2	2	2	2	0	149	51	286	140	49	Obstruction
235	40	F	12	1	1	3	1000	5	1	1	2	3	1	3	2	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	1	2	25	149	63	342	290	85	Normal
236	65	F	12	2	1	1	5000	5	1	1	2	3	1	3	2	2	3	0	0	0	0	1	4	1	2	2	2	2	1	2	0	0	1	1	1	2	2	2	2	1	0	150	70	275	350	127	Normal
237	50	F	12	1	2	1	2000	3	1	1	2	3	1	3	2	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	3	1	1	2	2	2	2	0	150	76	317	310	98	Normal
238	42	M	12	1	4	7	25000	4	3	2	1	1	2	0	0	1	3	0	0	0	0	1	3	2	2	1	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	180	60	512	460	90	Normal
239	31	M	12	1	6	7	10000	4	3	3	1	1	2	0	0	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	165	72	487	510	105	Normal
240	55	F	12	2	3	7	10000	4	3	3	1	1	1	3	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	147	62	294	250	85	Normal
241	54	F	13	1	3	1	4000	4	3	3	1	1	1	3	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	155	55	322	300	93	Normal
242	36	F	13	1	2	3	2000	2	2	2	1	1	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	151	60	359	390	109	Normal
243	70	F	13	1	1	3	4000	5	3	1	2	3	1	3	2	2	3	0	0	0	0	2	0	0	2	2	2	1	1	1	2	2	1	3	1	2	2	2	2	2	0	147	52	252	250	99	Normal
244	40	M	13	1	2	3	1000	4	2	1	2	3	2	0	0	2	2	2	20	4	15	2	0	0	2	2	2	2	0	0	0	0	1	1	1	1	2	2	2	2	0	159	48	445	310	70	Obstruction
245	50	M	13	1	3	3	1000	4	3	2	2	4	2	0	0	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	1	2	2	2	2	1	2	11	167	60	449	400	89	Normal
246	54	F	13	1	3	1	4000	8	3	3	1	1	1	3	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	165	48	352	290	82	Normal
247	50	M	13	1	1	2	4000	5	1	1	2	3	2	0	0	2	1	2	20	10	30	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	152	58	399	350	88	Normal
248	60	M	13	1	2	3	2000	1	1	1	2	3	2	0	0	2	2	2	20	25	10	2	0	0	2	2	2	1	1	1	1	2	1	3	1	1	2	1	2	2	13	150	54	369	290	78	Obstruction
249	55	M	13	1	2	3	1000	6	2	1	2	3	2	0	0	2	1	2	20	25	35	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	23	165	55	432	340	79	Obstruction
250	65	M	13	1	1	2	1000	2	1	1	2	3	2	0	0	2	2	2	20	5	25	2	0	0	2	2	2	2	0	0	0	0	1	1	1	1	2	1	2	2	18	159	43	288	250	87	Normal
251	50	M	13	1	2	2	1000	3	1	1	2	3	2	0	0	2	1	2	20	25	30	2	0	0	2	2	2	1	2	1	1	1	1	3	1	1	2	1	2	2	19	157	44	416	200	48	Obstruction
252	75	M	13	1	2	7	2000	2	1	1	2	4	2	0	0	2	1	2	25	4	50	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	22	159	50	365	320	88	Normal
253	56	M	13	1	1	3	1500	6	1	2	2	3	2	0	0	2	1	2	30	5	25	2	0	0	2	2	2	1	1	1	1	1	1	1	1	1	2	1	1	1	21	170	53	447	350	78	Obstruction
254	60	M	13	1	3	2	4000	6	3	1	2	3	2	0	0	2	1	2	20	10	40	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	22	170	49	437	320	73	Obstruction
255	32	F	13	1	2	7	3000	4	1	1	2	3	1	3	1	2	3	0	0	0	0	1	1	3	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	21	150	46	367	300	82	Normal
256	38	M	13	1	3	7	5000	6	2	2	2	3	2	0	0	2	1	2	28	10	10	2	0	0	2	2	2	2	0	0	0	0	1	1	2	2	2	2	2	2	0	169	44	484	350	72	Obstruction
257	57	M	13	1	1	2	2000	3	3	1	2	3	2	0	0	2	2	2	22	10	5	2	0	0	2	2	2	1	2	1	1	2	2	0	0	0	0	0	2	2	8	160	50	410	150	36	Obstruction
258	65	M	13	1	2	2	4000	8	1	2	2	3	2	0	0	2	1	2	40	22	25	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	12	164	38	405	350	86	Normal
259	30	F	13	1	3	1	5000	4	3	4	1	1	1	2	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	22	150	39	373	340	91	Normal
260	41	F	13	1	3	1	4000	4	3	1	2	1	1	3	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	146	40	330	290	88	Normal
261	45	F	14	1	2	3	3000	2	2	1	2	4	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	141	50	304	270	89	Normal
262	55	F	14	1	1	2	2000	1	3	2	1	3	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	144	56	285	260	91	Normal
263	47	F	14	1	3	1	3000	4	3	3	1	4	2	3	1	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	144	65	307	290	94	Normal
264	56	F	14	1	3	1	12000	3	2	3	1	1	1	3	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	138	65	264	300	114	Normal
265	35	F	14	1	2	1	4000	5	3	3	1	1	1	3	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	144	56	341	300	88	Normal
266	38	F	14	1	4	7	15000	4	3	4	1	1	1	2	1	1	3	0	0	0	0	1	1	1	2	2	2	1	1	1	1	1	1	3	1	2	1	1	1	1	0	153	60	361	330	91	Normal
267	55	F	14	1	2	7	3000	2	1	1	2	3	1	3	2	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	2	2	2	2	2	1	2	0	154	59	316	260	82	Normal
268	42	F	14	1	3	7	5000	5	3	2	1	1	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	1	2	0	154	58	352	300	85	Normal
269	38	F	14	1	3	2	1000	4	2	2	2	1	1	3	2	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	1	0	158	57	376	260	69	Obstruction
270	40	F	14	1	2	2	1000	8	3	4	1	1	1	3	2	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	1	1	2	2	1	2	1	0	147	51	336	240	71	Obstruction
271	42	F	14	1	3	2	1000	5	3	3	1	1	1	3	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	157	58	361	340	94	Normal
272	40	F	14	1	2	2	1000	5	3	2	1	3	1	3	2	1	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	155	50	361	280	77	Obstruction
273	35	F	14	1	2	2	1000	5	3	2	1	1	1	2	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	150	45	359	310	86	Normal
274	45	F	14	1	2	2	1000	5	2	2	2	3	2	3	2	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	1	0	146	40	319	240	75	Obstruction
275	48	M	14	1	3	2	1000	7	2	2	2	3	2	0	0	2	2	3	25	10	17	2	0	0	2	1	2	1	2	1	1	1	1	3	1	2	2	2	2	2	0	168	62	458	310	68	Obstruction
276	65	F	14	1	1	1	1000	3	3	2	2	5	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	11	157	47	297	330	111	Normal
277	55	F	14	1	1	2	1000	3	1	1	2	3	1	3	2	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	144	32	285	250	88	Normal
278	54	F	14	1	2	1	3000	5	3	2	1	3	1	3	2	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	154	56	319	360	113	Normal
279	55	F	14	1	2	2	1000	2	3	1	2	3	1	3	2	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	1	1	1	2	2	2	2	2	0	140	48	273	290	106	Normal
280	50	F	14	1	2	2	1000	3	2	3	1	1	1	3	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	156	63	336	280	83	Normal
281	50	M	15	1	3	2	1000	4	2	1	2	3	1	3	2	2	2	3	45	10	5	2	0	0	2	2	2	2	0	0	0	0	1	1	2	2	2	1	2	1	0	160	60	426	330	77	Obstruction
282	62	F	15	1	2	1	1000	1	2	2	2	3	2	0	0	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	3	1	2	2	1	1	1	15	149	51	280	290	103	Normal
283	60	M	15	1	2	2	1000	2	1	1	2	3	2	0	0	2	2	2	30	12	20	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	156	40	389	350	90	Normal
284	45	M	15	1	2	2	1000	4	2	2	2	3	2	0	0	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	19	163	28	448	520	116	Normal
285	35	M	15	1	3	2	1000	4	3	2	2	3	2	0	0	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	169	53	491	500	102	Normal
286	60	M	15	1	2	2	1000	3	1	1	2	3	2	0	0	2	2	2	20	16	25	2	0	0	2	2	2	1	2	1	2	2	1	1	1	2	2	2	1	1	1	0	159	55	399	300	75	Obstruction
287	49	M	15	1	3	2	1500	4	3	2	1	1	2	0	0	1	2	2	20	10	19	2	0	0	2	2	2	2	0	0	0	0	1	1	1	2	2	2	2	2	22	168	70	456	490	107	Normal
288	45	F	15	1	2	2	1500	7	2	2	2	3	1	3	2	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	2	1	2	2	2	2	2	11	153	50	341	350	103	Normal
289	70	F	15	1	1	2	1000	1	2	2	2	3	1	3	2	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	154	48	274	200	73	Obstruction
290	55	F	15	1	2	1	1500	4	3	3	2	1	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	2	1	2	2	1	1	1	0	149	55	300	160	53	Obstruction
291	42	F	15	1	2	2	1500	2	1	1	2	3	1	3	2	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	1	2	2	2	2	2	2	0	157	60	342	260	76	Obstruction
292	32	F	15	1	3	2	2000	4	3	2	2	3	1	2	2	2	3	0	0	0	0	2	0	0	2	2	2	1	2	1	2	1	1	2	1	2	2	1	1	1	0	151	62	370	360	97	Normal
293	32	F	15	1	3	2	2500	3	2	4	1	1	1	2	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	1	2	2	2	2	2	2	0	153	56	377	350	93	Normal
294	42	M	15	1	2	2	1500	4	1	1	2	3	2	0	0	2	2	2	25	3	15	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	168	45	472	450	95	Normal
295	35	F	15	1	3	2	5000	5	3	4	1	1	1	3	1	1	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	1	1	2	2	2	2	2	2	11	155	55	375	360	96	Normal
296	52	F	15	1	1	2	1500	4	1	1	2	3	1	3	2	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	145	49	296	330	111	Normal
297	60	F	15	1	1	2	3000	5	3	2	1	3	1	3	2	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	3	1	2	2	2	2	2	0	140	37	259	240	93	Normal
298	55	F	15	1	1	2	1500	5	1	1	2	3	1	3	2	2	3	0	0	0	0	1	4	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	145	45	288	250	87	Normal
299	55	F	15	1	2	2	4500	6	2	2	2	3	1	3	2	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	3	1	1	2	2	1	1	0	153	40	313	200	64	Obstruction
300	45	F	15	1	1	2	3500	4	2	4	1	3	1	3	2	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	1	2	2	2	2	2	2	0	157	55	334	290	87	Normal
301	45	F	16	1	1	2	3000	2	3	3	1	1	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	146	44	319	290	91	Normal
302	32	F	16	1	3	2	2500	3	3	2	2	3	1	2	2	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	3	1	2	2	2	1	2	0	155	55	383	320	83	Normal
303	45	F	16	1	1	2	7000	5	3	4	1	3	1	3	2	1	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	1	1	2	2	2	2	2	2	0	160	54	362	400	110	Normal
304	45	F	16	1	1	2	3500	4	2	2	1	3	1	3	2	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	0	1	2	0	150	49	331	340	103	Normal

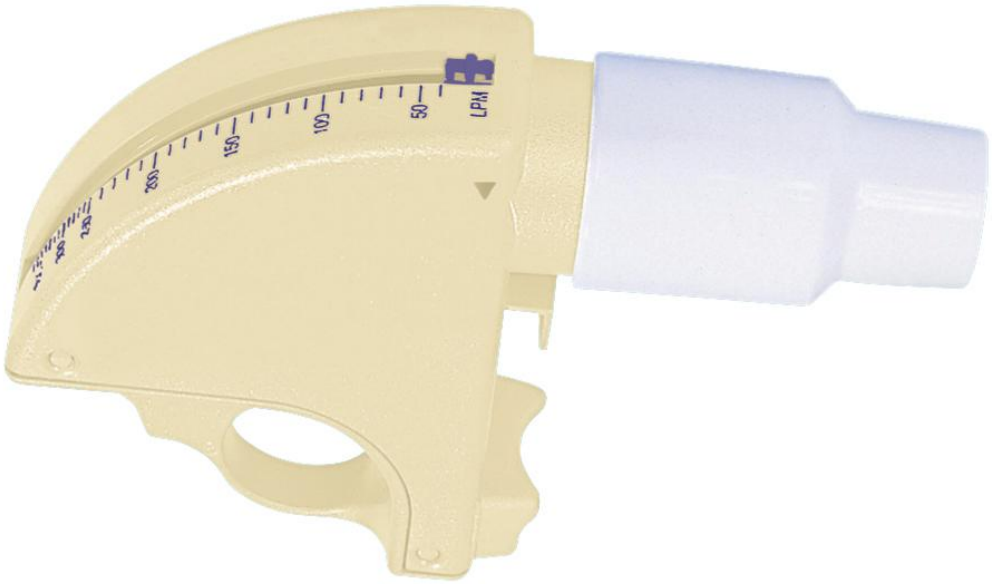
305	37	F	16	1	2	2	2000	5	2	1	2	3	1	3	2	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	150	40	353	320	91	Normal
306	36	M	16	1	4	3	5000	6	2	3	2	1	2	0	0	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	174	64	506	500	99	Normal
307	31	F	16	1	3	1	3500	6	2	3	2	1	1	2	1	2	3	0	0	0	0	2	0	0	2	2	2	1	2	1	1	1	1	1	2	2	2	2	1	1	0	161	62	404	300	74	Obstruction
308	49	M	16	1	4	7	15000	5	3	4	1	1	2	0	0	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	1	1	2	2	1	1	1	0	166	67	449	420	93	Normal
309	44	F	16	1	4	7	20000	5	3	4	1	1	1	3	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	1	2	2	2	1	1	1	0	156	67	353	360	102	Normal
310	45	M	16	1	3	7	3000	5	3	2	2	3	2	0	0	2	3	0	0	0	0	2	0	0	2	1	2	2	0	0	0	0	2	0	0	0	0	0	1	2	0	163	62	448	530	118	Normal
311	53	F	16	1	1	3	20000	3	3	3	1	1	1	3	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	2	1	1	2	2	2	2	0	152	62	316	290	92	Normal
312	31	F	16	1	1	3	4000	5	3	2	2	3	1	3	1	2	3	0	0	0	0	1	3	2	2	2	2	2	0	0	0	0	1	2	1	2	2	2	2	2	0	152	67	377	280	74	Obstruction
313	45	F	16	1	1	7	4000	3	2	2	2	3	1	3	1	2	3	0	0	0	0	1	1	3	2	2	2	2	0	0	0	0	1	3	1	1	2	2	2	2	0	152	52	338	290	86	Normal
314	45	F	16	1	1	1	3000	3	3	2	2	3	1	3	1	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	1	3	1	1	2	2	2	1	0	159	55	359	300	83	Normal
315	50	F	16	1	1	2	6000	10	3	2	2	3	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	3	1	1	2	2	2	2	0	146	53	305	340	111	Normal
316	50	F	16	1	2	1	4000	6	1	1	2	4	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	1	1	2	2	2	2	2	0	152	52	324	240	74	Obstruction
317	36	M	16	1	3	7	15000	4	2	2	2	1	2	0	0	1	3	0	0	0	0	1	3	2	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	169	69	489	560	114	Normal
318	56	M	16	1	1	2	7000	7	1	1	2	3	2	0	0	2	1	2	18	30	38	2	0	0	2	2	2	1	2	1	1	1	1	1	1	1	2	2	2	2	0	164	52	426	470	110	Normal
319	33	M	16	1	2	2	4000	5	3	1	2	3	2	0	0	2	1	4	28	3	5	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	17	165	53	482	430	89	Normal
320	55	M	16	1	1	3	4000	3	2	2	2	3	2	0	0	2	1	2	20	25	35	2	0	0	2	2	2	2	0	0	0	0	1	1	2	2	2	2	2	2	11	153	43	391	300	77	Obstruction
321	60	M	17	1	1	2	2000	2	3	2	2	3	2	0	0	2	1	2	20	10	40	2	0	0	2	2	2	1	2	1	1	1	1	1	1	2	2	2	2	2	18	151	37	372	270	72	Obstruction
322	45	F	17	1	1	2	3000	5	2	2	2	3	1	3	2	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	1	2	1	2	2	2	2	2	21	156	54	350	340	97	Normal
323	65	M	17	1	1	7	2000	2	3	2	2	3	2	0	0	2	1	2	20	3	45	2	0	0	2	2	2	1	2	1	1	1	1	1	1	1	2	2	2	2	0	153	36	368	150	41	Obstruction
324	42	M	17	1	2	7	10000	2	3	1	1	1	2	0	0	2	3	0	0	0	0	1	4	1	2	2	2	1	2	1	1	1	1	3	1	2	2	2	2	2	0	159	76	441	390	88	Normal
325	42	M	17	1	1	3	4000	6	3	2	2	3	2	0	0	2	1	2	15	25	27	2	0	0	2	2	2	2	0	0	0	0	1	1	1	1	2	2	2	2	0	157	41	435	370	85	Normal
326	65	F	17	1	3	3	2000	4	1	2	2	3	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	14	166	57	324	400	123	Normal
327	30	M	17	1	3	7	3000	5	3	2	2	3	2	0	0	2	3	0	0	0	0	1	3	3	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	151	37	441	400	91	Normal
328	48	F	17	1	1	2	7000	6	3	2	2	3	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	151	42	326	380	117	Normal
329	58	M	17	1	3	3	3000	3	3	4	1	1	2	0	0	1	1	1	17	10	41	2	0	0	2	2	2	2	0	0	0	0	1	1	1	2	2	2	2	2	0	174	63	455	450	99	Normal
330	50	M	17	1	1	2	5000	6	3	2	2	3	2	0	0	2	2	2	20	22	20	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	17	166	56	446	490	110	Normal
331	50	M	17	1	3	2	6000	5	2	1	1	3	2	0	0	2	1	2	20	3	30	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	1	2	17	165	40	443	310	70	Obstruction
332	54	M	17	1	1	3	5000	5	3	2	2	3	2	0	0	2	1	2	20	6	34	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	12	173	54	461	510	110	Normal
333	30	M	17	1	1	2	8000	3	3	2	2	3	2	0	0	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	15	162	55	478	440	92	Normal
334	52	F	17	1	1	1	6000	8	3	3	1	1	1	3	1	2	3	0	0	0	0	1	3	2	2	2	2	2	0	0	0	0	1	2	2	2	2	2	2	2	0	150	72	311	300	96	Normal
335	30	F	17	1	1	2	5000	7	3	2	2	3	1	2	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	138	28	337	270	80	Normal
336	45	F	17	1	1	2	4000	6	3	2	1	3	2	0	0	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	156	54	350	280	80	Normal
337	40	F	17	1	1	2	4000	4	3	2	2	3	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	1	1	2	2	2	2	2	0	153	58	355	360	101	Normal
338	60	F	17	1	1	1	10000	9	3	2	2	3	1	3	2	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	142	34	265	250	94	Normal
339	32	F	17	1	3	2	8000	9	3	2	2	3	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	141	64	340	320	94	Normal
340	55	F	17	1	1	1	4000	6	1	3	2	3	2	3	2	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	144	33	285	250	88	Normal
341	50	F	18	1	1	1	5000	5	2	1	2	3	1	3	1	2	3	0	0	0	0	1	1	3	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	161	72	351	310	83	Normal
342	38	F	18	1	1	1	5000	5	3	2	2	3	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	3	1	1	2	2	2	1	0	159	71	379	420	110	Normal
343	45	F	18	1	1	2	6000	6	2	2	2	3	1	3	1	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	1	3	1	1	2	2	2	1	0	149	57	328	180	55	Obstruction
344	55	F	18	1	1	2	3000	5	3	2	2	3	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	142	44	279	310	111	Normal
345	55	F	18	1	1	3	3000	7	3	2	2	3	2	3	2	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	2	1	2	2	2	2	2	0	149	41	300	280	93	Normal
346	30	F	18	1	1	2	10000	5	3	2	2	3	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	146	38	361	370	102	Normal
347	60	F	18	1	2	1	4000	3	3	2	1	1	1	3	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	147	39	280	160	57	Obstruction
348	50	F	18	1	3	7	10000	2	3	1	2	1	2	0	0	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	155	56	333	270	82	Normal
349	51	F	18	1	2	7	1500	2	3	2	1	1	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	148	53	308	370	120	Normal
350	60	F	18	1	1	3	4000	5	3	2	2	3	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	151	41	292	250	86	Normal
351	60	F	18	1	1	2	2000	1	1	1	2	3	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	2	1	1	2	2	2	2	0	149	54	286	276	94	Normal
352	38	F	18	1	2	2	3000	4	3	2	2	1	1	2	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	155	43	367	310	84	Normal
353	30	F	18	1	1	3	5000	5	3	2	1	3	1	2	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	153	37	383	410	107	Normal
354	30	F	18	1	5	1	24000	6	2	2	1	1	1	1	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	161	84	407	350	86	Normal
355	50	F	18	1	3	2	3000	2	2	1	1	2	1	3	2	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	145	47	302	260	86	Normal
356	60	F	18	1	3	7	3000	4	3	2	1	1	1	3	1	1	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	142	50	265	300	113	Normal
357	46	F	18	1	2	1	8000	7	3	2	1	4	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	3	1	1	2	2	2	1	0	146	59	316	240	76	Obstruction
358	40	F	18	1	2	1	3000	4	3	2	1	1	1	3	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	151	55	348	350	101	Normal
359	30	F	18	1	3	1	20000	15	3	4	1	1	1	2	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	151	41	376	310	82	Normal
360	33	F	18	1	3	1	5000	4	2	2	2	1	1	2	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	2	1	1	2	2	2	1	0	167	60	417	350	84	Normal
361	57	M	19	1	3	3	5000	4	2	2	2	1	2	0	0	2	1	4	25	10	32	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	172	69	450	400	89	Normal
362	50	F	19	1	1	2	3000	4	3	2	2	3	2	0	0	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	3	1	1	2	2	2	2	17	157	49	339	300	88	Normal
363	40	M	19	1	3	3	3000	6	2	1	2	1	2	0	0	2	3	0	0	0	0	1	3	2	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	169	70	479	500	104	Normal
364	53	F	19	1	3	1	3000	5	3	1	1	1	2	0	0	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	146	48	297	310	104	Normal
365	60	F	19	1	1	1	1000	2	2	2	2	3	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	152	48	296	250	84	Normal
366	37	F	19	1	2	7	3000	2	3	1	2	2	1	3	1	2	3	0	0	0	0	1	3	2	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	149	57	350	300	86	Normal
367	52	F	19	1	3	1	3000	3	3	2	2	1	1	3	1	1	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	1	2	0	150	50	311	380	122	Normal
368	31	F	19	1	3	1	10000	9	3	4	1	1	1	1	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	164	65	413	460	111	Normal
369	55	F	19	1	1	1	5000	3	3	3	1	1	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	144	55	285	340	119	Normal
370	50	F	19	1	1	1	3000	2	1	1	2	3	1	3	1	2	3	0	0	0	0	1	1	3	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	150	44	317	250	79	Obstruction
371	36	M	19	1	3	7	7000	4	3	2	1	4	2	0	0	2	3	0	0	0	0	1	0	0	2	2	2	2	0	0	0	0	1	3	1	2	2	1	1	1	0	172	70	499	450	90	Normal
372	45	F	19	1	3	1	5000	4	2	3	1	1	1	3	1	1	3	0	0	0	0	1	3	2	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	166	75	380	330	87	Normal
373	50	F	19	1	3	7	15000	6	3	4	1	1	1	3	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	156	70	336	390	116	Normal
374	30	F	19	1	2	2	5000	5	3	2	2	3	1	2	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	163	44	413	350	85	Normal
375	35	F	19	1	1	2	4000	5	3	2	1	2	1	2	1	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	150	55	359	300	84	Normal
376	31	F	19	1	3	1	2000	4	3	1	2	1	1	2	3	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	162	64	407	350	86	Normal
377	35	F	19	1	2	2	1000	4	3	2	2	2	1	2	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	144	52	341	260	76	Obstruction
378	45	F	19	1	2	1	5000	4	2	2	1	1	1	3	1	1	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	1	2	1	2	2	2	1	1	0	152	66	338	390	115	Normal
379	39	F	19	1	3	1	3000	2	3	3	1	1	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	155	85	364	410	113	Normal
380	46	F	19	1	3	1	10000	3	3	3	1	1	1	3	1	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	1	3	1	1	2	1	2	1	0	151	104	331	330	100	Normal
381	41	M	20	1	2	7	3000	2	3	3	1	1	2	0	0	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	150	65	413	440	106	Normal
382	34	M	20	1	3	2	4000	4	2	2	1	1	2	0	0	1	3	0	0	0	0	1	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	1	1	0	166	60	483	420	87	Normal

383	46	M	20	1	3	5	5000	4	2	2	2	1	2	0	0	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	161	64	439	440	100	Normal
384	55	F	20	1	1	1	5000	6	3	4	1	1	1	3	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	149	50	300	265	88	Normal
385	51	F	20	1	1	1	5000	5	3	1	2	1	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	154	50	327	340	104	Normal
386	30	F	20	1	3	1	11000	6	3	2	1	1	1	2	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	160	85	404	400	99	Normal
387	44	F	20	3	1	7	5000	4	2	2	1	1	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	2	2	2	2	2	2	2	0	147	55	326	360	110	Normal
388	34	F	20	2	3	1	15000	4	2	1	1	1	1	2	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	1	2	0	153	52	372	360	97	Normal
389	39	F	20	1	3	7	8000	2	2	2	1	1	1	2	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	144	53	330	330	100	Normal
390	55	F	20	1	1	1	8000	9	3	3	1	1	1	3	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	144	55	285	320	112	Normal
391	33	F	20	1	3	1	6000	4	3	2	1	1	1	2	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	154	65	378	340	90	Normal
392	39	F	20	1	3	1	6000	5	2	2	1	1	1	2	1	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	1	3	1	2	2	1	1	1	0	145	55	333	260	78	Obstruction
393	49	F	20	1	2	1	5500	2	3	2	1	1	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	1	2	0	148	63	314	310	99	Normal
394	38	F	20	1	2	1	20000	5	3	1	2	1	1	2	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	1	2	0	147	70	342	350	102	Normal
395	33	F	20	1	3	1	15000	4	3	2	1	1	1	2	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	146	70	353	320	91	Normal
396	46	F	20	1	3	1	4000	4	3	2	1	1	1	3	1	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	1	2	1	2	2	2	2	2	0	144	85	310	250	81	Normal
397	37	F	20	1	3	1	6000	4	2	3	2	1	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	160	95	384	340	88	Normal
398	38	F	20	2	3	7	5000	6	2	3	1	1	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	152	55	358	310	86	Normal
399	31	M	20	1	3	3	5000	4	2	1	2	4	2	0	0	2	1	2	16	25	15	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	165	60	487	400	82	Normal
400	46	M	20	1	3	7	7000	7	2	3	1	1	2	0	0	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	1	2	13	168	70	463	430	93	Normal
401	50	F	21	1	1	7	5000	5	2	2	1	4	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	3	1	1	2	2	2	1	0	153	70	327	310	95	Normal
402	35	F	21	1	2	1	3000	4	2	1	2	1	1	2	1	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	156	55	378	320	85	Normal
403	40	F	21	1	1	2	4000	6	1	1	2	4	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	2	1	2	2	2	2	2	0	154	62	358	300	84	Normal
404	45	M	21	1	2	2	10000	4	1	1	2	3	2	0	0	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	161	51	441	450	102	Normal
405	40	M	21	3	2	7	5000	5	2	2	2	3	2	0	0	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	161	85	452	490	108	Normal
406	48	F	21	1	3	2	5000	5	1	2	2	1	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	148	50	317	300	95	Normal
407	35	F	21	1	2	2	4000	5	1	2	2	1	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	148	42	353	300	85	Normal
408	58	M	21	2	3	7	5000	2	1	2	2	1	2	0	0	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	158	52	401	360	90	Normal
409	60	F	21	1	1	2	3000	7	2	2	1	1	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	2	1	2	2	1	1	1	0	152	49	296	300	101	Normal
410	55	F	21	3	1	1	5000	6	2	2	1	3	1	3	2	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	3	1	1	2	2	2	2	0	154	70	316	360	114	Normal
411	40	F	21	1	3	1	4000	4	2	2	2	1	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	3	1	1	2	2	2	2	0	156	90	364	320	88	Normal
412	31	F	21	1	3	1	5000	4	3	2	1	1	1	2	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	146	59	358	320	89	Normal
413	45	F	21	3	3	1	3000	5	1	1	2	3	1	3	2	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	136	36	289	310	107	Normal
414	37	F	21	1	1	1	5000	5	1	1	2	1	1	3	1	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	155	64	369	360	97	Normal
415	45	M	21	1	1	2	4000	4	1	2	2	3	2	0	0	2	1	2	30	25	15	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	160	53	438	470	107	Normal
416	45	M	21	1	3	7	6000	4	2	2	1	1	2	0	0	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	13	165	67	455	500	110	Normal
417	35	F	21	1	1	2	750	2	2	1	2	3	1	3	2	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	1	2	1	2	2	2	2	2	0	155	53	375	320	85	Normal
418	50	M	21	1	1	2	4750	2	3	2	2	4	2	0	0	2	3	0	0	0	0	2	0	0	2	1	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	161	64	429	520	121	Normal
419	55	M	21	1	3	7	5000	6	2	2	2	3	2	0	0	2	1	2	25	10	30	2	0	0	2	2	2	2	0	0	0	0	1	1	2	2	2	2	2	2	0	168	65	442	300	68	Obstruction
420	47	F	21	1	3	1	20000	15	3	4	1	1	1	2	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	17	157	52	347	300	86	Normal
421	40	M	22	3	2	3	2000	1	1	1	2	3	2	0	0	2	2	2	20	25	10	2	0	0	2	2	2	1	1	1	1	2	1	3	1	1	2	1	2	2	0	156	67	435	310	71	Obstruction
422	48	M	22	1	4	7	10,000	6	3	4	1	1	2	0	0	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	11	163	75	441	510	116	Normal
423	39	M	22	2	3	7	10000	6	3	2	1	3	2	0	0	2	1	2	18	10	21	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	1	2	0	158	63	445	450	101	Normal
424	42	F	22	1	1	3	4000	5	3	2	2	3	1	3	1	2	3	0	0	0	0	1	3	2	2	2	2	2	0	0	0	0	1	2	1	2	2	2	2	2	8	146	59	327	370	113	Normal
425	35	F	22	1	1	7	4000	3	2	2	2	3	1	3	1	2	3	0	0	0	0	1	1	3	2	2	2	2	0	0	0	0	1	3	1	1	2	2	2	2	0	160	55	390	350	90	Normal
426	56	F	22	1	1	1	3000	3	3	2	2	3	1	3	2	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	1	3	1	1	2	2	2	1	0	138	45	264	220	83	Normal
427	32	F	22	1	3	1	3000	5	3	1	1	1	2	0	0	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	153	56	377	350	93	Normal
428	46	F	22	1	1	1	1000	2	2	2	2	3	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	158	61	353	370	105	Normal
429	51	F	22	1	2	7	3000	2	3	1	2	2	1	3	1	2	3	0	0	0	0	1	3	2	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	163	57	354	320	90	Normal
430	59	F	22	1	3	1	3000	3	3	2	2	1	1	3	1	1	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	1	2	0	149	45	289	350	121	Normal
431	39	F	22	1	3	1	10000	9	3	4	1	1	1	1	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	155	59	364	340	93	Normal
432	42	F	22	1	1	1	5000	3	3	3	1	1	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	145	52	324	400	123	Normal
433	55	F	22	1	1	1	3000	2	1	1	2	3	1	3	1	2	3	0	0	0	0	1	1	3	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	165	60	349	290	83	Normal
434	33	M	22	1	1	7	2000	2	3	2	2	3	2	0	0	2	1	2	20	3	13	2	0	0	2	2	2	1	2	1	1	1	1	1	1	1	2	2	2	2	0	170	68	499	550	110	Normal
435	57	M	22	1	2	2	1500	4	1	1	2	3	2	0	0	2	2	2	25	3	15	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	11	153	55	386	270	70	Obstruction
436	43	M	22	1	3	7	20000	2	3	3	1	1	2	0	0	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	15	170	69	476	520	109	Normal
437	36	M	22	2	3	7	15000	4	2	2	2	1	2	0	0	1	3	0	0	0	0	1	3	2	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	169	73	489	450	92	Normal
438	45	M	22	1	2	2	1000	3	1	1	2	3	2	0	0	2	2	2	20	15	22	2	0	0	2	2	2	1	2	1	2	2	1	1	2	2	2	1	1	1	0	154	60	417	500	120	Normal
439	36	F	22	1	1	2	1500	4	3	3	1	4	1	3	1	1	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	7	165	59	402	350	87	Normal
440	45	F	22	3	2	7	3000	2	2	2	1	4	1	3	1	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	1	1	2	1	2	2	1	2	0	152	56	338	320	95	Normal
441	58	F	23	1	1	1	3000	4	2	4	1	4	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	1	1	1	1	2	1	2	1	2	2	2	2	2	0	157	60	317	370	117	Normal
442	51	F	23	1	2	2	2000	5	1	1	2	3	1	3	1	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	1	2	2	2	2	2	2	2	0	148	52	308	250	81	Normal
443	44	F	23	1	1	2	1500	4	3	3	1	4	1	3	1	1	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	146	55	322	350	109	Normal
444	55	F	23	3	2	7	3000	2	2	2	1	4	1	3	1	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	1	1	2	1	2	2	1	2	0	159	56	331	300	91	Normal
445	52	F	23	1	1	1	3000	4	2	4	1	4	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	1	1	1	1	2	1	2	1	2	2	2	2	2	0	168	62	366	400	109	Normal
446	48	F	23	1	2	2	2000	5	1	1	2	3	1	3	1	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	1	2	2	2	2	2	2	2	0	144	52	305	250	82	Normal
447	60	M	23	1	2	3	4000	8	3	1	2	3	2	0	0	2	1	1	25	4	35	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	163	45	413	350	85	Normal
448	65	M	23	1	3	1	6000	7	3	3	1	1	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	3	1	1	2	2	2	1	19	148	67	269	150	56	Obstruction
449	65	F	23	1	1	1	2000	2	1	1	2	3	1	3	1	2	3	0	0	0	0	2	0	0	2	2	1	1	1	1	1	1	1	4	1	1	2	1	2	1	0	153	51	285	228	80	Normal
450	35	F	23	1	2	2	3000	5	3	2	1	2	1	1	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	3	1	1	2	2	2	1	0	152	53	366	330	90	Normal
451	62	M	23	1	2	2	4500	5	2	1	2	3	2	0	0	2	2	2	15	30	44	2	0	0	2	2	1	1	1	1	1	1	1	3	1	1	1	1	2	2	0	163	46	409	140	34	Obstruction
452	35	F	23	1	2	3	4000	4	3	3	1	1	1	1	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	30	141	38	332	270	81	Normal
453	56	F	23	1	3	7	14000	7	3	3	1	4	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	153	54	310	250	81	Normal
454	65	F	23	1	2	1	5000	6	2	2	2	1	1	3	1	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	147	46	266	280	105	Normal
455	65	F	23	1	1	1	1000	1	2	1	2	3	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	145	37	260	250	96	Normal
456	30	F	23	1	4	1	4000	5	3	4	1	1	1	1	2	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	1	2	2	1	1	1	1	0	153	58	382	370	97	Normal
457	55	F	23	1	3	2	5000	3	3	2	2	3	1	3	1	2	3	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	140	49	273	380	139	Normal
458	38	M	23	1	1	2	2500	4	2	2	1	3	2	0	0	2	3	0	0	0	0	2	0	0	2	1	2	2	0	0	0	0	1	1	2	2	2	1	1	1	0	155	79	437	293	67	Obstruction
459	45	F	23	1	2	3	3000	5	2	2	2	1	1	3	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	133	33	280	290	103	Normal
460	38	F	23	1	3	2	3000	4	3	4	1	4	1	2	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	147	36	342	290	85	Normal

461	42	F	24	1	3	3	3000	3	3	4	1	4	1	2	1	1	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	151	57	346	442	128	Normal
462	34	M	24	1	3	2	10000	7	2	4	1	3	2	0	0	2	3	0	0	0	0	2	0	0	2	1	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	175	61	513	530	103	Normal
463	55	F	24	1	2	1	3000	5	2	3	1	4	1	3	1	1	3	0	0	0	0	2	0	0	2	1	2	2	0	0	0	0	1	2	2	2	2	1	2	1	0	148	49	297	304	102	Normal
464	32	M	24	1	3	3	6000	8	3	4	1	4	2	0	0	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	170	72	508	650	128	Normal
465	35	M	24	1	4	7	5000	5	3	4	1	1	2	0	0	2	2	1	15	5	18	1	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	175	70	511	650	127	Normal
466	60	F	24	1	1	2	2000	5	2	1	2	3	1	3	1	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	11	139	53	256	520	203	Normal
467	45	M	24	1	3	6	8000	7	3	3	1	4	2	0	0	2	3	0	0	0	0	1	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	1	2	0	172	70	478	570	119	Normal
468	40	F	24	1	1	7	6000	4	3	2	1	3	1	3	2	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	1	2	1	2	2	1	2	0	146	42	333	295	88	Normal
469	30	M	24	1	2	3	3000	3	1	1	2	3	2	0	0	2	1	1	20	2	10	2	0	0	2	2	2	2	0	0	0	0	2	0	0	0	0	0	2	2	0	165	55	489	650	133	Normal
470	33	M	24	1	1	3	5000	3	1	1	2	3	2	0	0	2	3	0	0	0	0	2	0	0	2	2	2	2	0	0	0	0	1	1	2	2	2	1	2	2	11	160	67	465	314	67	Obstruction
471	35	M	24	1	1	1	36000	4	1	3	1	3	2	0	0	1	3	0	0	0	0	1	4	1	2	2	2	no	0	0	0	0	2	0	0	0	0	0	2	2	0	175	70	511	650	127	Normal
472	57	M	24	1	1	1	36000	4	1	3	1	3	2	0	0	1	1	1	12	20	44	2	0	0	2	2	2	no	0	0	0	0	2	0	0	0	0	0	2	2	0	153	55	386	270	70	Obstruction
473	33	M	24	1	1	1	19000	7	1	2	1	3	2	0	0	1	1	1	16	10	16	2	0	0	2	2	2	yes	2	1	1	1	1	1	1	1	2	2	2	2	18	170	68	499	550	110	Normal
474	45	M	24	1	1	1	19000	7	1	2	2	3	2	0	0	2	2	2	20	22	15	2	0	0	2	2	2	no	0	0	0	0	2	0	0	0	0	0	2	2	11	160	53	438	470	107	Normal
475	54	M	24	1	2	2	3000	7	1	1	2	3	2	0	0	2	2	2	10	20	40	2	0	0	2	2	2	no	0	0	0	0	2	0	0	0	0	0	2	2	13	173	54	461	510	110	Normal
476	56	F	24	1	2	2	3000	7	1	1	2	4	1	2	2	2	3	0	0	0	0	2	0	0	2	2	2	no	0	0	0	0	1	3	1	1	2	2	2	1	18	138	45	264	220	83	Normal
477	35	F	24	1	2	2	3000	5	1	2	2	4	1	2	2	2	3	0	0	0	0	2	0	0	2	2	2	no	0	0	0	0	2	0	0	0	0	0	2	2	0	141	38	332	270	81	Normal
478	45	F	24	1	3	3	3000	5	1	1	2	4	1	2	2	2	3	0	0	0	0	2	0	0	2	2	2	no	0	0	0	0	2	0	0	0	0	0	2	2	0	133	33	280	290	103	Normal
479	48	F	24	1	3	3	3000	3	1	1	1	2	1	2	1	2	3	0	0	0	0	1	1	1	2	2	2	no	0	0	0	0	2	0	0	0	0	0	2	2	0	148	50	317	300	95	Normal
480	60	F	24	1	3	3	3000	3	1	1	1	1	1	3	1	1	3	0	0	0	0	1	1	1	2	2	2	no	0	0	0	0	2	0	0	0	0	0	2	2	0	147	39	280	160	57	Obstruction

ANNEXURE – IX

PEAK FLOW METER



ANNEXURE – X

INSTITUTIONAL ETHICS COMMITTEE
MADRAS MEDICAL COLLEGE, CHENNAI -3

Telephone No : 044 25305301
Fax : 044 25363970

CERTIFICATE OF APPROVAL

The Institutional Ethics committee of Madras Medical College, reviewed and discussed your application for approval of the proposal entitled "A cross section study on the prevalence of chronic obstructive pulmonary disease among adults aged 30 years and above in Ellapuram block of Thiruvallur District" No.14082012.

The following members of Ethics Committee were present in the meeting held on 10/08/2012 conducted at Madras Medical College, Chennai -3.

1.	Dr. S.K. Rajan. M.D., FRCP., DSc	Chairperson
2.	Prof. Pregna B. Dolia MD Vice Principal, Madras Medical College, Chennai -3 Director , Institute of Biochemistry, MMC, Ch-3	Member Secretary
3.	Prof. B. Vasanthi MD Prof of Pharmacology ,MMC, Ch-3	Member
4.	Prof. C. Rajendiran, MD Director , Inst. Of Internal Medicine, MMC, Ch-3	Member
5.	Prof. S. Deivanayagam MS Prof of Surgery, MMC, Ch-3	Member
6.	Thiru. S. Govindsamy. BABL	Lawyer Social
7.	Tmt. Arnold Soulina MA MSW	Scientist

We approve the proposal to be conducted in its presented form.

Sd/ Chairman & Other Members

The Institutional Ethics Committee expects to be informed about the progress of the study, and SAE occurring in the course of the study, any changes in the protocol and patients information / informed consent and asks to be provided a copy of the final report.

Member Secretary, Ethics Committee

ANNEXURE – XI PLAGIRISM REPORT